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Deflating the Balance Sheet to Inflate Earnings

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THE desire to show profits has caused many companies to write down the valuation of their plant and equipment. The author, who is president of the New York chapter of the National Association of Cost Accountants, reviews the motives for this action and appraises them from a long-time standpoint.

He points out that heavy write-downs do not appeal to established business organizations; they see no purpose in juggling the cost of their fixed assets from decade to decade as the wind happens to blow. Wear, tear, and obsolescence occur each year and properly represent a cost to be considered and weighed in when computing the year's earnings.

If invested capital is wiped out in one fell swoop instead of being apportioned over the years of useful life, later years will not bear their share of the cost of obsolescence If assets are marked down to "market" value, which today is really distress value, there is no assurance that coming years will not demonstrate that value to be excessively low.

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ACROSS the financial pages of our daily newspapers the last few months has appeared a succession of corporation annual statements in which reference is made to substantial write-downs of plant and equipment. Printed reports sent to stockholders amplify and explain these write-downs, some mounting to many millions of dollars. It has become the fashion to write down and write off, and the result is this procession along the avenue of corporate accounting practice. And like most fashions, the idea in which they were conceived soon becomes obscured by this twist here or that bow there, so that the mode in millinery goes cavorting off on a tangent that has no relationship to the basic design.

We read the story of George Bernard Shaw's recent visit to a California motion picture studio, during which he remarked to a pretty and well known movie star as she finished the sequence of the picture she was making: "Why does a girl with a nice face like yours wear a hat like that?" The report goes that she hurriedly left the set for her dressing room, there to break forth into tears. So, it can be said of some of the corporations which are following the mode of the hour: "With a nice face like yours and the nice figure you have attained during your successful lifetime, why do you rush off in the darkest, dreariest days of depression to follow a fashion that may well become your lean, anemic sisters, but not you." We surmise in a few years such corporations will regret their impetuous action.

It is the purpose of this article to review the reasons for this mode of the hour, what it accomplishes, and the effect it has on present and future financial statements and operating results of corporations which follow it. Everywhere directors of corporations and financial and accounting executives are discussing what should be done with their plant accounts. They see their competitors indulging in the write-off practice, and they realize that in some respects advantages appear which would tend to give their competitors the edge during future years. They feel they should proceed along the road to deflation, and they are right to a certain extent. But when deflating the balance sheet results in inflating future earnings, they should think twice before taking the step.

It is the income or earnings statement that tells the real story of the success of the worth of an enterprise. "What are the earnings per share?" is the popular question rather than "What is the book value per share?" And it is toward increasing income, toward raising up the "earnings per share" that management effort is primarily directed. During the last several years, the element of expense existing in every business, which stood out so prominently in the income statement as "Depreciation of Plant and Equipment," has worried management. It is a fixed charge that rips away a good chunk of the "income before depreciation" and turns some nice black figures into vivid red ones.

When sales were in good volume, prices high and plants fairly active, depreciation represented a minor part of the total income from sales. But now that the wheels have ceased to whir so evenly and sweetly, there stands the old rock "depreciation" as

a formidable obstacle toward attaining black figures in the income statement. "It's only a bookkeeping item and means nothing. It should be eliminated," says one anxious manager. "We are running only 20 per cent of capacity and therefore we should have only 20 per cent of the depreciation we had when we were running full," speaks up a treasurer. "Our plants are all shut down; so we have no depreciation expense," adds a worried president. And then another executive declares: "If we have no values on our books for our plant and equipment, we will have no depreciation because zero dollars multiplied by 5 per cent equals zero. Nobody pays any attention, anyhow, to what we carry our plants at on our balance sheet. We have plenty of cash, owe nothing much, and are in splendid net current asset position with ample working capital. Our stock is without par value and so we can shrink up the stated value, make a capital surplus and, bang, charge off the whole works. Our stockholders will compliment us on how conservative we are, carrying all our vast facilities at $1, and from now on, hurrah, no more depreciation. We are bound to show good earnings. Also, we shall get a better break on our own profit-sharing bonus."

Is Unfair to Stockholders and Competitors

So runs the logic of the enterprises which have entirely written off their plants and equipment, and this is likewise true of those which have inordinately slashed plant values below fair worth. It is only natural that in these dark days of corporate earnings all kinds of straws should be grasped at to decrease losses and eventually turn toward profits. It is the management's job to earn profits and this they seek to do by all acceptable means. But it is incorrect and unfair to the corporation's own stockholders to turn out income statements in future years showing no or insufficient expense for depreciation, and it is unfair to competitors to fix prices below cost, which is what is apt to happen when depreciation is not considered an element of cost to be recouped in the selling prices determined upon.

Of course the old discussion arises as to what is depreciation and why it has to be included as an element of cost of doing business, since it does not represent a cash outlay during the year reported on. However, it is now everywhere recognized that the wear, tear and obsolescence of the plant and equipment (the usage and wastage of capital) which occurs regularly each year does represent a cost to be considered and weighed in when stating the year's earnings. If the capital invested in plant and equipment is wiped off in one fell swoop instead of apportioned over the years of useful life, these years will not absorb their proper share of this wearing-out process.

Out of the whole question comes this dominating consideration. After plant and equipment is written down or otherwise adjusted in value, will the future years' income account continue to bear fair and reasonable annual charges for depreciation of the plant and equipment actually in use during those years? If the plan of adjustment is such as to accomplish this result, then it is not believed any serious quarrel can be picked over the manner or the method or the extent of adjusting present valuations.

From the balance sheet viewpoint it is somewhat a matter of whether one prefers vanilla or chocolate ice cream. Plant and equipment accumulated over a long period of years is bound to represent heterogeneous valuations, some low because of acquisition in days of low prices, some high because purchased or built in times of high prices. An enterprise is presumably in business to stay for many years. It spent money to acquire these assets, and as they wear out or tend to become obsolete, it is hoped and expected that the earnings derived from using them will pay back the original outlay. If any part has ceased to be usable, and would be gladly parted with if a buyer appeared on the horizon, then the money poured into such part, not yet recouped by depreciation charge-off, has of course gone for naught other than what such buyer might be willing to pay for it. Writing down to market value plant and equipment definitely abandoned as unusable is proper and defensible. The loss in investment has occurred and in the future these assets will not contribute anything toward making the product which is to be sold and from which earnings will be derived.

Writing Down to "Market" Value

The question will arise, what is the market value to which it should be written down? These days there is no real market for surplus plant and equipment, so that it cannot be accurately determined. However, if, based on good business judgment, some round sum value is assigned at which it is believed during the course of the next few years the plant and equipment can be ultimately disposed of, then the enterprise will have acted fairly to adjust its valuations. Thereafter depreciation need not be charged off and when the assets are actually disposed of the difference between the assigned residual value and the price received will constitute the further adjustment one way or the other. There can be no dispute about this treatment of this sort of assets, and perhaps it is owed to stockholders to disclose to them on the balance sheet the unusable plant and equipment available for disposition at a value commensurate only with what it is expected can fairly be obtained.

Let us consider the view of those corporations which assembled a group of subsidiaries and plants in the heyday of corporate mergers and consolidations and set up on their books these plants and the equipment at their then appraised value. They have had to take each year since a good healthy bite of depreciation, because in those years construction and machinery costs were high and the values on the books reflected this condition. Construction costs have tumbled 25 to 30 per cent since those years, and machinery prices as much, if not more. Such consolidations approach this question of reducing depreciation by claiming that, as the present sound replacement value of the assets is substantially below book worth, they should be written down to present worth. They counter the argument that cost must be recouped through the operating account by stating that it is not cost which must be recouped but an amount sufficient to replace the depreciating assets when their useful life has terminated. Or to put it another way, that since the lowered annual depreciation will eventually deduct out of earnings sufficient entirely to replace the assets, it is not necessary, or right, to deduct amounts greater than will be necessary to replace them. They say that if depreciation were continued on the basis of the original high cost or appraisal value, earnings would be charged with an excessive amount. Thus, the two schools of accounting thought and practice: depreciation should be on basis of (1) cost, (2) replacement value.

Do Current Prices Represent Sound Value?

At any rate, no matter upon which side of the argument one finds himself, should a corporation write down its plant and equipment to present sound value less observed depreciation in order to lower the future annual depreciation charge, the action can scarcely be criticized as improper or as tending to inflate unfairly the earnings of future years. But what is sound value is even debatable. It is supposed to be the present cost to build or to acquire new. With a construction and machinery market as we have today—or rather lack of any market—we wonder whether currently quoted prices may be said to reflect sound value.

But he who seeks to follow some logic behind his determination to write down his company's plant, and would like to eliminate future depreciation entirely if he dared, advances the thought that it is not sound value which should be the base, but market

value. He points out that if a brand new competitor were to enter the arena afresh this competitor would go out and buy one of the many plants available, set up modern machinery which he can buy used from many dealers, and launch into business at a distinct advantage, because in future the low cost of his plant and equipment would make the depreciation charge very low. Therefore, when asset values are to be adjusted, our "depreciation-saver" contends they should be reduced to the point where future depreciation charges will enable the enterprise to compete with a new entrant into the business. Through such reasoning we have the executive who wishes to cut his assets to "market value" in order to increase future earnings. "Distress value" is a better designation; a market presupposes buyers and sellers, and for the purchase of plants there are no buyers these days.

There are many variations of these approaches. Some believe that plant and equipment actually in use (though perhaps not to capacity) should be written down to sound value; such not now in use but intended and expected to be used in future when activity returns should be reduced to market value to keep it competitive with new manufacturers; and such as is definitely set aside as not usable written off entirely or to a nominal amount. The reasons and the methods are as variegated as the colors of fashionable millinery.

Tax Provisions

In the struggle for more and better earnings, the United States Treasury Department stands adamant. The income tax law provides that the actual cost of plant assets constitutes the base for the annual percentage charge-off of depreciation allowable as a deduction in income tax returns. Twist balance sheet values around as you will, slice depreciation to zero or to any amount, and it matters not. When the tax return is prepared the old-fashioned allowance for depreciation must appear on line 22. So as not to be taken too literally it should be added that loss in useful value of plant and equipment may be deducted in the year sustained, but to secure this deduction it is necessary almost to establish that the plant has been abandoned to the tax collector and the equipment carted to the dump. Adjustment in values may have some slight bearing on insurable worth, but whether left high or slashed low the insurance company will be guided by insurable values rather than book figures. In tax districts where book figures play some part in the judgment of assessors in fixing valuation, writing down assets may result in decreasing taxes.

With all this movement toward deflating plant and equipment values it has not yet taken the form of a grand rush. Many corporations are standing pat, feeling that the slough of the depression is no place from which to view the worth of plant and equipment, assets which have served for many years and will continue in future to serve in the quest for profits. They reason that as the future dawns they can chart their course toward earnings year by year, altering it when necessary, and analyzing and subdividing depreciation to meet the peculiar accounting and financial problems of the year and pointing out to stockholders the significance of these figures from the competitive angle. They feel the balance sheet should always show the cost of plant and equipment and its orderly extinguishment through regular depreciation charges. They believe that an established business should act like one and not juggle its cost of fixed assets from decade to decade as the wind happens to blow.

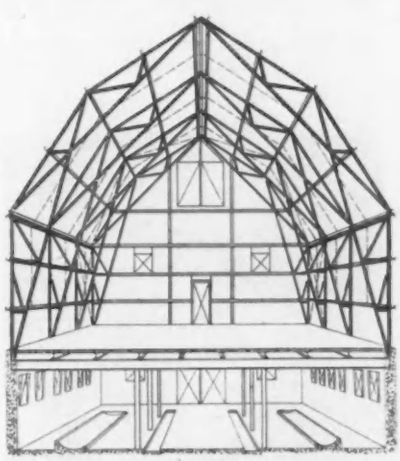
Everyone knows that fixed asset account in the balance sheet is not taken literally as expressing the real worth of those assets. It normally presents what they have cost and what so far has been written off for depreciation. When assets go out of service and are no longer of use in the business it seems proper to add to depreciation reserve and deduct in the income account, or even in the surplus account, an amount for extraordinary depreciation and loss in value. But otherwise it is not felt by many executives that the gross or net value of assets actually usable, ready for use and intended to be used if orders were on hand, should be adjusted upward or downward to reflect changes from year to year in replacement worth or to give effect to lack of use or utility because of insufficient volume.

In retrospect we ofttimes wonder why we did the things we did in 1928 and 1929, why we followed practices that more sober thought proved faulty, even vicious. May we hazard the firm conviction that the "writers-off" who join the fashion parade of 1932-1933 will in a few years be moved to tears by the ill-becoming $1 value with which they clothed their plant and equipment.

Steel Homes for Cows

SEVERAL fabricators in the Central West have completed designs and are prepared to offer steel barns in the full range of sizes ordinarily required. Among these designs is that of the Worden Allen Co., Milwaukee. All shop connections are made by the welding process and field connections are bolted. Standard shapes are used throughout.

By means of various designs of trusses these barns may be had in widths up to 50 ft. and truss spacing varies from 20 to 25 ft. The foundation or cow-barn section may be made of masonry or concrete. The floor construction consists of steel beams supported on steel posts. In order to eliminate fire hazard a concrete slab is poured over the cow-barn. The steel trusses that form the loft are made in convenient sections so that two men with the aid of a tractor or a team of horses can erect the structure without the aid of special tools.



All shop connections are welded and all field connections are bolted. Two men can erect this barn.

Window frames and doors are made of steel and the loft is covered with sheet metal. Insulation is not required in the loft. By grounding the steel frame the lightning hazard is reduced to the minimum. Steel and concrete construction minimizes the fire hazard.

Farmers Interested in Possibilities

At present the buying power of the farmer is limited but interest in steel barns on the part of the farmer is unquestionably high. He wants security for his stock and freedom from the hazards of lightning and loss by fire. His experience with insurance is not always to his liking. For instance some insurance companies insist in many cases on patching rather than replacing badly damaged barns. In some sections of the country there are as yet no lower insurance rates on steel barns than on those of the older types of construction. Here is a problem for the steel fabricator and steel producer to solve. They should combine in their efforts to help the farmer get equitable insurance rates on steel structures so that the farmer will get rates that will be an inducement for him to want the additional advantages which are to be had from steel barns.

Cast Iron Suitable for Nitrogen Hardening

NITROGEN - HARDENED castings have been made since 1928 in the British works with which the author is connected. They are aluminum-chromium alloys, given a treatment akin to that accorded nitralloy steel. They have been given the test of time in the form of cylinder liners and are suggested for cams, gears and the like where resistance to wear and corrosive conditions obtain and the required shapes may be complicated. The records contributed by the author cover both sand-cast and centrifugally-cast Nitricastiron, as the product is called.

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EXPERIMENTAL work in the production of cast iron suitable for nitrogen hardening was undertaken by the companies with which the writer is connected, under the direction of the writer. This work was commenced in the year 1928, and the first castings made commercially were oil engine cylinder liners, which were put into service in October of that year. Since this date experiments have been continued which have resulted in the commercial perfection of an alloy cast iron and the manufacturing processes for the production of this material suitable for nitrogen hardening by treatment with anhydrous ammonia gas at a low temperature of 500 deg. C. after the manner of the familiar nitriding process as applied to nitralloy steels.

An Aluminum-Chromium Cast Iron

This alloy cast iron suitable for nitrogen hardening is now known commercially as Nitricastiron. It is essentially an aluminum chromium alloy. Full details of two typical analyses together with the mechanical properties in various stages of treatment are given in Tables I and II. The material described in Table I has been cast by the centrifugal process while that detailed in Table II has been cast in green sand molds. All the tests have been carried out on annular ring form specimens of the type recommended in British Standard Specification No. 5004 and 4K6 (aircraft material), and all the hardness determinations made with a Firth Hardometer using the diamond indenter and a 30-kg. load. The chemical analyses given in the tables are typical of Nitricastiron.

The lower combined carbon contents of the sand-cast specimens are due to the slower cooling of the metal in sand molds. In the centrifugal casting process metal molds are used, and this would be expected to result in a higher combined carbon content. The higher combined carbon content in the latter specimens is evidently not destroyed by the annealing to which the specimens have been subjected.

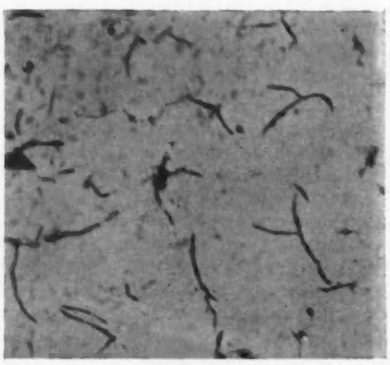


Fig. 1.—Sand-cast Nitricastiron, unetched, 300 diameters.

The carbon determinations on the materials in the as-cast condition are given in Tables I and II. The slight change in the combined carbon and graphite due to annealing is shown by these results.

The centrifugally cast specimens are harder to machine than the sand cast material. The annealed centrifugal castings were turned in the lathe at a speed of 70 ft. per min. with a depth of cut of ⅛ to 3/16 in. and a feed of 40 cuts per in., using Widia-tipped tools. The machining speed of the sand castings in the annealed condition was 90 ft. per min. with a depth of cut of ⅛ to 3/16 in. and a feed of 30 to 40 cuts per in. with the same kind of tools.

Castings Annealed for Machining

Aluminum chromium cast irons of this composition have distinct air hardening properties. To ensure uniform machining qualities the castings are submitted to an annealing treatment at 950 deg. C., followed by slow cooling prior to machining. After rough machining and prior to finish

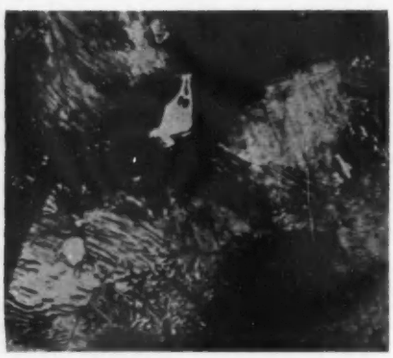


Fig. 2.—Same as Fig. 1, etched with picric acid, 600 diameters.

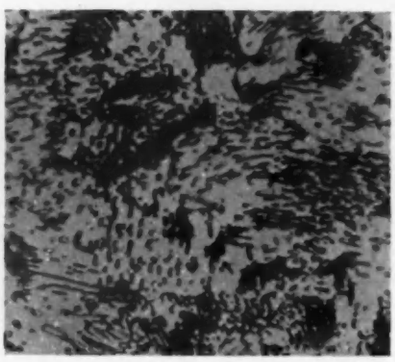


Fig. 3.—Same as Fig. 1, annealed and etched with picric acid, 600 diameters.

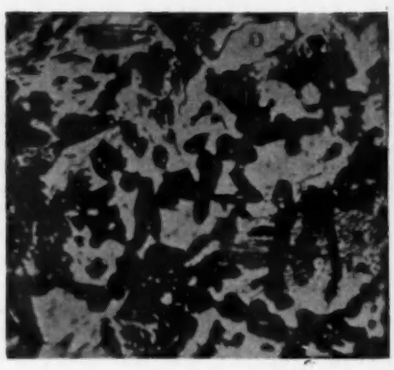


Fig. 4.—Same as Fig. 1, hardened and tempered, 600 diameters.

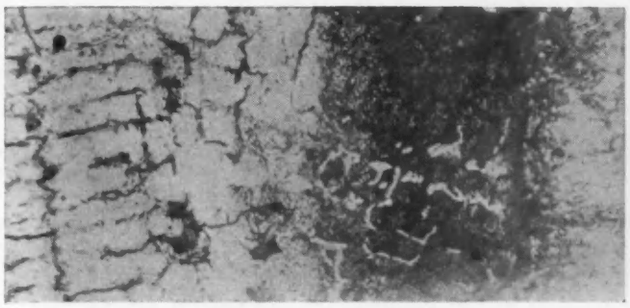


Fig. 5.—Sand-cast Nitricastiron, nitrided surface, etched with picric acid, 100 diameters.

Fig. 6.—Centrifugally-cast Nitricastiron, nitrided surface, etched with picric acid, 200 diameters.

machining the castings are preferably submitted to heat treatment by hardening and tempering. This treatment is best performed by quenching in oil from 870 deg. C. and tempering at 600 deg. C. The tempering treatment may be prolonged to provide a stabilizing treatment intended to remove internal stresses and thus minimize distortion during nitrogen hardening.

The nitrogen hardening treatment consists essentially of the exposure of the castings to the action of anhydrous ammonia gas at a temperature of 510 deg. C. for a period of from 80 to 90 hr. This treatment is carried out under conditions exactly similar to the standard nitrogen hardening treatment as applied to nitralloy steels.

The Properties of Nitricastiron

In examining the properties detailed in Tables I and II, it is clear that the modulus of elasticity (EN value) is considerably higher at all stages of the treatment than that of ordinary centrifugally cast material. Centrifugally cast iron made to the requirements of the aircraft material specification has an average EN value of 16 to 17 million lb. per sq. in. The alloy cast iron has a minimum value of 22.5 and 19.5 million lb. per sq. in. in the centrifugally cast and sand cast conditions respectively. This value changes slightly in the upward direction with each treatment. The nitrogen-hardened specimens have a distinctly higher EN value than the material in the as-cast condition.

The strength values have been expressed as tensile strength in the terms of the previously-mentioned specification. For the sake of better comparison, these values are expressed also in terms of the modulus of rupture. Centrifugally cast material to the 4K6 specification possesses average strength values of 40,000 to 45,000 lb. per sq. in., corresponding to moduli of rupture of 65,000 to 72,000 lb. per sq. in. The strength of this aluminum-chromium alloy is therefore considerably higher than that of the ordinary centrifugally cast material. The heat-treatment of the alloy is accompanied by a distinct increase in strength amounting to approximately 25 per cent. The nitrogen-hardened specimens show a slight falling-off from the strength level attained as a result of heat-treatment.

The permanent set is an arbitrary value commonly used in testing material for piston rings, cylinder liners and valve inserts, and represents the permanent change in the gap of a gapped rig after stressing at 31,000 lb. per sq. in. (British Standards Institution formula). The values, which increase in the hardened and stabilized condition, are definitely low. Standard centrifugally cast material usually shows a permanent set of the order of 8 to 10 per cent. The change in hardness of the material due to the heat-treatment is clearly indicated, annealing being accompanied by a distinct softening. Specimen No. 12 in the series shows a slightly higher value than would be expected, due possibly to some slight irregularity in the treatment.

The properties of the sand cast specimens have approximately the same tendencies as those of the centrifugally cast material. In magnitude the values of the modulus of elasticity (EN value) and tensile strength are lower than those of the same material centrifugally cast; but at the same time they are distinctly higher than those of ordinary centrifugally cast material, and quite equal to the best results obtainable with ordinary sand cast iron for high-duty purposes. The permanent-set values are higher than those of the centrifugally cast alloy and more nearly approach those obtained from ordinary centrifugally cast material. In the as-cast and annealed condition the hardness is lower, but in the hardened and stabilized condition it more nearly approaches the hardness of the same alloy centrifugally cast. The sand cast material is somewhat less stiff and less strong than the centrifugally cast metal.

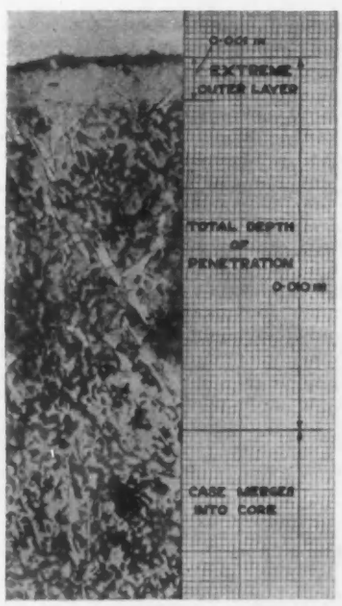


Fig. 7.—Centrifugally-cast Nitricastiron at 600 diameters instead of 200, as shown in Fig. 6; the reproduction has been reduced to one-third of the original.

Microstructure

Figs. 1, 2 and 3 show the unetched and etched microstructures of the sand-cast specimens in the as-cast and annealed condition. In the as-cast condition the matrix consists of very finely-laminated pearlite and extremely small graphite flakes, together with substantial quantities of free carbides. In the annealed condition (Fig. 3) the pearlite carbide is seen to have coagulated in a ferrite matrix. The finely-divided graphite is more clearly visible in this micrograph, and the free carbides are somewhat less in quantity.

The hardened and tempered structure is shown in Fig. 4. The matrix containing free carbide and graphite is presumably pearlitic in character, although it was found impossible to resolve this at a magnification of 1500 diameters. It was found to contain a large amount of small specks, which are probably carbides thrown out of solution during cooling. The dark-gray constituent is probably intermediate between troostite and pearlite, and this constituent is almost absent in specimen No. 11 possessing the lower hardness figure.

The microstructures of the centrifugally cast specimens were similar to those of the sand cast specimens, with somewhat finer graphite and a larger amount of free carbide.

For comparison purposes a standard specimen of nitralloy steel LK3

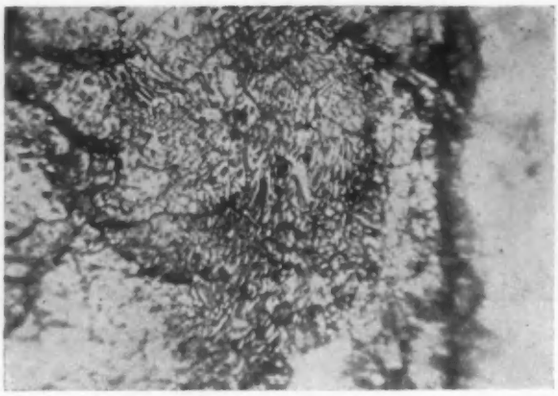


Fig. 8.—Sand-cast Nitricastiron, nitrided surface, etched with picric acid, 600 diameters.

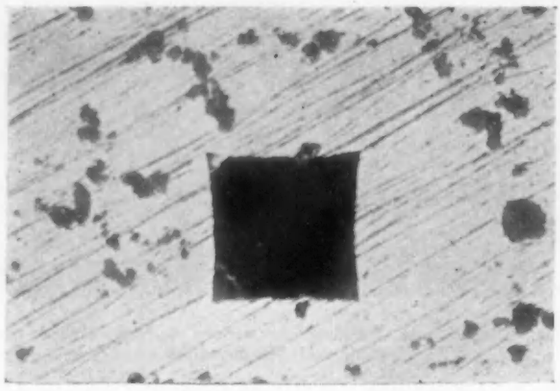


Fig. 9.—Diamond hardness impression on nitrided surface of centrifugally-cast Nitricastiron, 110 diameters.

was subjected to the nitrogen hardening treatment along with the specimens of cast iron. The hardness and depth of penetration obtained are given in Tables I and II. The alloy, both when sand-cast and when centrifugally-cast, gave hardness and depth of penetration values somewhat lower than those of the control-steel specimen; the degree of hardness attained and also the depth of penetration in the centrifugally-cast specimens were slightly greater than those of the sand-cast specimens.

To illustrate the structure of the hardened layer, micrographs have been chosen from several other specimens from the same cast of alloy material. Fig. 5 shows the structure of a sand-cast specimen, and Fig. 6 that of a centrifugally-cast specimen. The nitrogen-hardened layer in both cases etches darker than the core with picric acid. The carbides exist in the hardened case apparently undecomposed, and an extreme outer layer which etches lighter than the hardened case can be clearly seen under the microscope and is visible in Fig. 6.

Fig. 7 shows the same specimen as Fig. 6 at a higher magnification. The extreme outer layer is clearly visible in this illustration, as are also the free massive carbides, the small specks of deposited carbides and the darker etching of the ground-mass constituents. It is of general interest to note that some of the massive carbide areas in the nitrogen-hardened portion show one or more rectilinear markings in a direction at right angles to their longest axis. None of the carbide areas in the core appears to show these markings.

Immediately underneath the extreme outer layer is a concentration of specks of a third constituent. This appears to be characteristic, and a further example is shown in Fig. 8, illustrating the extreme outer edge of a sand-cast specimen. The depth of penetration of the hardening effect shown in Fig. 8 corresponds to the depth of the dark-etched case shown on the specimen at the lower magnification.

In all the specimens examined, the nitrogen hardened surface is quite coherent and is not easily flaked or spalled. Under the microscope the polished surfaces of the hardened specimens show numerous small cavities. These are due to the presence of the free graphite in the surface and are illustrated in Fig. 9, which also shows a typical diamond hardness impression. The complete absence of spalling is demonstrated by this impression. The ring-form specimens used in the testing procedure are of rectangular cross-section, but in testing them no sign of flaking or spalling occurs even at the extreme corners of the section until stresses closely approximating to the breaking stresses are attained.

Applications of Nitricastiron

While the principal applications of Nitricastiron are the manufacture of the various types of cylinders and cylinder liners used in the construction of engines, pumps and compressors, there are quite a variety of other engine parts to which the application of this material might be considered usefully. The fuel pump and parts associated with it, particularly the fuel pump body casting, is a typical example in connection with compression ignition engines. Cast-iron skew gears, constant mesh gears, wiper cams and a variety of bushes and collars are among the many other items where it might be expected that the hardened Nitricastiron would give useful service.

Many different types of castings in this material of varying degrees of complexity have been produced already by ordinary sand-casting methods, but by far the largest commercial application at the present time is the production of cylinder

Table I—Centrifugally Cast Aluminum-Chromium Cast Iron

Tot. Carbon Per Cent	Graphite Per Cent	Combined Carbon Per Cent	Silicon Per Cent	Manganese Per Cent	Sulphur Per Cent	Phosphorus, Per Cent	Chromium, Per Cent	Aluminum, Per Cent	Vanadium, Per Cent	Titanium, Per Cent	Molybdenum, Per Cent
2.61*	1.38	1.23	2.58	0.61	0.07	0.096	1.69	1.43	trace	nil	nil

Spec. No.	*Condition*	*Treatment*	Modulus of Elasticity En Value, 10^6 Lb. per Sq. In.	Tensile Strength, Tons per Sq. In.	Modulus of Rupture, Tons per Sq. In.	Permanent Set, Per Cent	Firth Diamond Hardness Numeral	Depth of Penetration of Nitriding, In.
3	As cast		22.5	24.5	39.2	2.56	418	....
4	As cast		22.5	25.9	41.5	Not taken	418	....
7	Annealed	950 deg. C followed by slow cooling in furnace.	22.5	31.5	50.4	2.78	302	....
8	Annealed		23.7	29.8	47.8	Not taken	302	....
11	Hardened and stabilized	Quenched in oil from 876 deg. C. Reheated to 600 deg. C for 1 hr. followed by slow cooling in still air	23.0	29.5	47.2	4.75	302	....
12	Hardened and stabilized		22.7	31.4	50.4	Not taken	364	....
15	Nitrogen hardened	90 hr. at 510 deg. C.	24.8	28.9	46.8	Not taken	962	0.016
16	Nitrogen hardened	90 hr. at 510 deg. C.	23.5	29.8	47.8	Not taken	982	0.018
17	Nitralloy steel LK3	90 hr. at 510 deg. C.	Control Specimen				1066	0.026

*As cast condition; cast No. 147.

liners by the centrifugal casting process. Most of the smaller types of gasoline engines, compression ignition engine and Diesel engine types of liners have been produced and the present experience of the behavior of the material in service is derived from these smaller engines.

Fig. 10 shows a charge of 300 small liners before closing the box prior to inserting in the hardening furnace. A large number of Nitricastiron cylinder liners have been fitted to various types of engines and are under close observation in service, some of them operating on services under notoriously difficult conditions insofar as cylinder wear is concerned. Many of these have now been in service and under observation for a period of two years and in all cases excellent results are being obtained.

The nitrogen hardened surface is definitely corrosion resisting and this property is one which is likely to prove of value in engine cylinder liners. In several cases already liners have been manufactured hardened externally as well as internally with the object of providing some resistance to corrosion on the cooling water side. A further aspect which is of some importance in considering the applications of Nitricastiron is the ability to reharden parts which have become worn without running any risk of damage to machined surfaces, keyways and threaded holes. These surfaces not required to be hardened can be protected and as there is no sealing or no reheating and the hardening itself is conducted at a low temperature, risk of damage is completely eliminated.

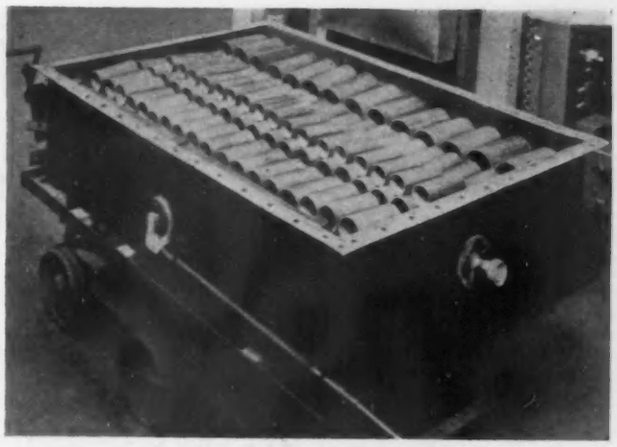


Fig. 10.—Charge of 300 Nitricastiron cylinder liners prior to closing box for nitriding.

It is considered that as the properties of Nitricastiron become more widely known its application will extend widely. It places in the hands of the designer and engineer a material with all the advantages of cast iron, ability to cast readily into complicated forms and shapes, and wearing surfaces of a superhard character.

Single-Stand Continuous Rolling of Hot and Cold Strip

THE use of one single four-high reversing stand to do the entire work of the continuous mill in rolling such material as strip was discussed before the Cleveland district section of the Association of Iron and Steel Electrical Engineers by A. P. Steckel, president, Cold Metal Process Co., Youngstown. In hot rolling, he said, the capacity of such a mill is in excess of 10 tons per hr. per ft. of width, these figures applying to steel rolled to No. 12 gage from an initial slab thickness of 4 to 5 in. The weight of a single piece practical to roll in this type of mill he put at as high as 1 ton per ft. of width, which, he added, is in excess of the weight possible to produce in existing continuous hot mills.

He touched on the arrangement for keeping the hot strip on coilers in hot chambers close to the mill on either side, so that storage in the hot chambers during rolling keeps the edges of the material hotter than the interior. It has been found, he explained, that the maintenance of a high temperature on the edges of the strip contributes favorably to preventing wear of the rolls at the point where the rolls ordinarily cut out first, that is to say, at the part of the rolls that is rolling the edges of the material.

Sufficient work has already been done on this type of mill, he said, to warrant the assertion that on low-carbon steel a pair of rolls will produce a material of good finish after producing 60 tons per ft. of width in No. 12 gage. This would mean in the worst case changing rolls once every 6 hr. when working at normal capacity. Over against this he pointed out that a roll-changing rig may be provided capable of changing rolls in a few minutes. He offered as another argument in favor of his design the fact that it provides for the sharp bending of the material at each

(*Concluded on Advertising Page* 12)

Table II—Aluminum-Chromium Cast Iron, Cast in Green Sand

Tot. Carbon Per Cent	Graphite Per Cent	Combined Carbon Per Cent	Silicon Per Cent	Manganese Per Cent	Sulphur Per Cent	Phosphorus, Per Cent	Chromium, Per Cent	Aluminum, Per Cent	Vanadium, Per Cent	Titanium, Per Cent	Molybdenum, Per Cent
2.65*	1.80	0.85	2.44	0.60	0.075	0.098	1.58	1.37	trace	nil	nil

Spec. No.	Condition	Treatment	Modulus of Elasticity En Value, 10^6 Lb. per Sq. In.	Tensile Strength, Tons per Sq. In.	Modulus of Rupture, Tons per Sq. In.	Permanent Set, Per Cent	Firth Diamond Hardness Numeral	Depth of Penetration of Nitriding, In.
1	As cast		19.5	19.8	31.6	6.1	340	....
2	As cast		19.4	22.9	36.7	Not taken	340	....
5	Annealed	950 deg. C followed by slow cooling in furnace.	19.7	25.8	41.3	9.7	269	....
6	Annealed		19.7	Not taken	...	Not taken	262	....
9	Hardened and stabilized	Quenched in oil from 870 deg. C. Reheated to 600 deg. C for 1 hr. followed by slow cooling in still air	19.2	28.6	45.7	Not taken	300	....
10	Hardened and stabilized		18.2	Not taken	...	Not taken	241	....
13	Nitrogen hardened	90 hr. at 510 deg. C.	20.1	Not taken	...	Not taken	894	0.015
14	Nitrogen hardened	90 hr. at 510 deg. C.	20.3	23.9	38.3	Not taken	904	0.015
17	Nitralloy steel LK3	90 hr. at 510 deg. C.	Control Specimen				1066	0.026

*As cast condition; cast No. 147.

Replacement De

Each pin is given four passes through the rough grinder. The operator checks his work by means of a micrometer.

FOR the past three and one-half years, the Elgin Machine Works, Elgin, Ill., has been running close to capacity. The secret of its success in so doing is the combination of a quality product with a constant search for capable dealers. No effort is made to sell manufacturers, the replacement demand, properly cultivated, being sufficient to maintain the production rate.

This article deals with the methods employed to secure and maintain high quality of product, which after all is the more important part of the problem.

S. A. E. bar stock rolled to the required diameter is purchased in 12 to 14-ft. lengths and in diameters ranging from ⅝ in. to 2¼ in. These bars are stored in racks convenient to a battery of 12 Gridley automatics, which drill the solid bar and cut the stock to length a fraction of an inch longer than that desired for the finished pin. The company's catalog lists thousands of sizes of piston pins for automobile, truck and tractor engines, some of which have not been manufactured for 10 or 12 years. Therefore as a usual thing not more than one Gridley automatic is set up at a time to start operations on a pin of given size. Two single-spindle machines are used for pins that are drilled clear through when the depth of the drilling operation is too great for the Gridley automatics.

Some piston pins are specified with a hole that tapers from both ends. These pins, after having been drilled, are taken in baskets to a special double-head reamer made by Hoefer Mfg. Co., Freeport, Ill. This unit is magazine fed to an automatic vise, which grips the pin and holds it securely while reamers automatically advance from both sides. The tools advance the necessary depth, then back out, and the pin is automatically ejected from the machine which reloads from the magazine.

This machine is motor driven, there being a separate motor for each of the two spindles which are driven through gears. The pin holding device is hydraulically operated. As the pins drop from the reamer they fall into metal pans in which they are carried to turret lathes. At this point pins of all sizes and specifications meet to be cut to exact lengths and have the ends chamfered. Limits on the lengths of pins are held to 0.005 in.

If specifications call for additional drilling, or milling such as center slots or keyways, the pins are moved across an aisle to machines that are equipped with quick-acting vises. The operations so far described are all in a straight line, at the end of which, in another building, is the heat treating department.

The pins are here dumped into a rotary gas-fired carburizing furnace. For the ordinary run city gas, a mixture of manufactured and natural gas, is used as the carburizing agent. However, on large pins, where warping may be a factor the pins are packed in a carburizing compound. The temperature is raised to 1650 deg. F. and is controlled by a Leeds & Northrup potentiometer. The gas used in the carburizing chamber of this American Gas Furnace Co. unit is dehydrated by passing it through two cylinders of calcium chloride.

The usual depth of case is 3/64 in. Five times during the carburizing period the furnace is opened and pins are removed for a break test to observe the rate of penetration and also to stop the process when the desired depth of case has been reached. This furnace, operating 24 hr. a day, carburizes 150,000 pins a month.

Inside and Outside Scale Removed

After carburizing, the pins are quenched and then placed on cast iron racks which are made with fingers so that each rack will hold 17 pins. The loaded racks are piled two high in a gas-fired hardening furnace furnished by the Barkling Fuel Engineering Co., Chicago. Temperatures range from 1380 to 1460 deg. F., depending on the size of the pins and the wall thickness.

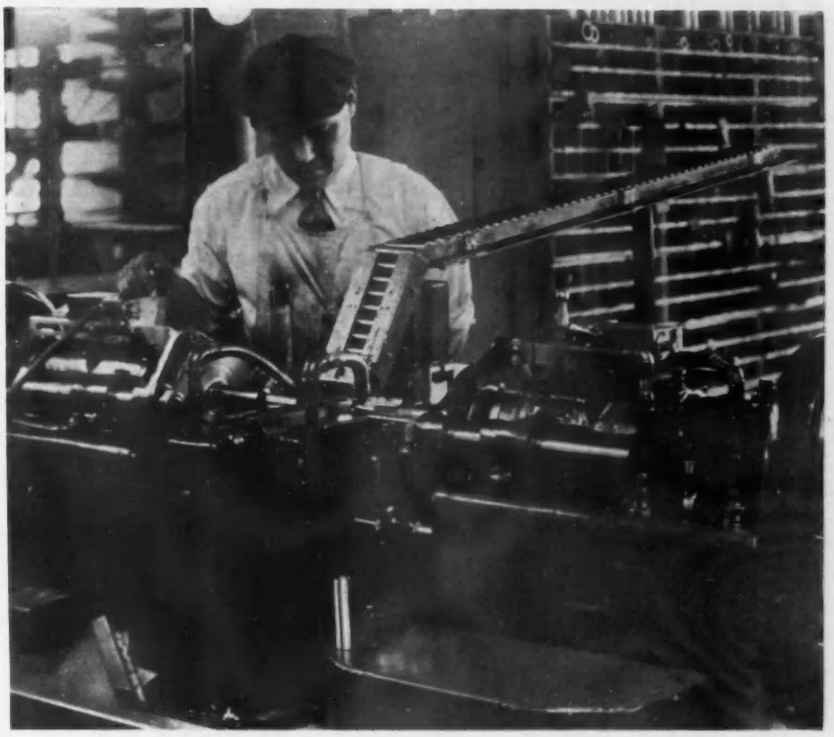
The pins are then quenched and placed in a rotary blaster in which steel shot is used. By this method all scale is removed from both the outside and the inside. The pins then double back on the other leg of the U production line, the shipping department being opposite the Gridley automatics. As received in the grinding department there remains 0.015 in. of metal on the diameter

Demand Stabilizes Piston Pin Production

to be removed in three operations, namely, rough grinding, finishing grinding and lapping. These operations are performed on three machines furnished by Cincinnati Grinders, Inc.

The rough grinder is fitted with wheels of 60 grit, and each pin is given four passes. The machine is magazine fed. The size of the pins is checked by the operator who uses a micrometer. When he passes the pins to the finish grinding machine there is 0.0015 in. of metal on the diameter still to be removed. Three to four passes are made through the finish grinder which is fitted with wheels of 120 grit. This operation has a working limit of 0.0005 in. After finish grinding, diameters are checked on a Fritz Werner gage.

The lapping or ultrafinish operation calls for wheels of 500 grit. Each pin is given two passes. The object of this operation is to obtain the desired finish and not to remove metal. The finished pins must measure within 0.0005 in. on the diameter. All pins are then inspected for dimensions, hardness and surface, after which they are given a hot slush coating to prevent rusting. They are then moved to the packing and shipping department.



Piston pin holes are tapered from both ends on this automatic double-head machine. The vise jaws are hydraulically operated.

Five break tests are made during the carburizing period. On the truck are pins placed on cast iron racks, piled two high, for placement in the hardening furnace.

New Copper Plating Bath

A NEW bath to take the place of the cyanide bath in the electrolytic deposition of copper on steel was discussed in a paper presented jointly to the Electrochemical Society by Prof. Colin G. Fink, head of the division of electrochemistry of Columbia University, New York, and Chaak Y. Wong, of Canton, China, who had included the subject in a chemical engineering thesis. A complex copper salt—disodium diaquodioxalatocupriate—is used, with sodium sulphate and boric acid also constituents of the bath. The development is the result of studies to provide for a substitute of the copper cyanide bath because of its decidedly poisonous nature. The sodium compound is used mainly to improve the conductivity of the bath. A low current density and a short plating period are found to be optimum working conditions. Ten amperes per square foot for 60 sec. proved very satisfactory. A good, adherent copper deposit is obtained, forming a satisfactory basis for the acid copper bath to follow.

Preheats Sheet Rolls Electrically

PREHEATING rolls of sheet and tin plate mills by means of electrical induction has been achieved by the Electric Furnace Co., Ltd., London, England. Portable apparatus has been developed and the illustrations show how it is used. Meanwhile from a monograph on the subject by A. G. Robiette, of the Electric Furnace Co., some observations may be made on the experience with and the economies of the method.

The pair of rolls to be heated, mounted in place, of course, in their stand, are encircled with a coil of copper strip or bar wound on edge and braced together and supported on two rods. In one of the pictures the heater is shown being lowered over the pair of rolls and in another it is being fitted into working position. The lower ends of the copper bars are connected by flexible cable and the connecting-up is effected in a matter of 3 min. by tightening up a single bolt. The rolls are covered by a sheet or blanket of asbestos to minimize the loss of heat by radiation, which is also reduced by the fact that the rolls have a planished surface.

An alternating current passes through the coil, which is always comparatively cool, and this generates heat in the roll by eddy currents and hysteresis. The heater is supported clear of the rolls so that the mill can be revolved if another mill in the same train is required to be put into service. Normally the rolls are stationary—which is a saving in power—yet the heating is uniform round the circumference. It has been found convenient to work the heater from a 100 to 120-volt single-phase supply.

If two heaters are used these can be operated from a three-phase supply with suitable transformer connections. Three heaters or multiples of three can, of course, be connected to a three-phase supply. For a 30 x 42-in. roll the loading per heater is 50 to 60 k.w., and the time required to raise the temperature uniformly to 570 deg. F. is approximately 12 hr. The consumption of energy will therefore be 600 to 720 k.w.hr., with transformer capacity of 100 to 120 k.v.a.

The heaters may be constructed suitable for commercial periodicities of 40, 50, or 60 cycles per second. The power factor is approximately 50 per cent. This, however, is found to be relatively unimportant, as the load is required during an off-peak period, so that the main supply cables will be lightly loaded and no extra provision has to be made. Moreover, as the power is required on a Sunday night and early on a Monday morning, an advantageous rate may be generally obtained.

The transformer in the installation studied is installed midway along the mill train, with a run of busbars under the floor plates from which toppings are taken by means of lugs. One of the illustrations shows the transformer and busbar arrangement.

To emphasize the economies of the preheating by induction, Mr. Robiette has supplied the results of several months' working, compiled in the accompanying tables. The cost of operating the heater is found to be so small per ton of metal rolled as to be negligible, especially in comparison

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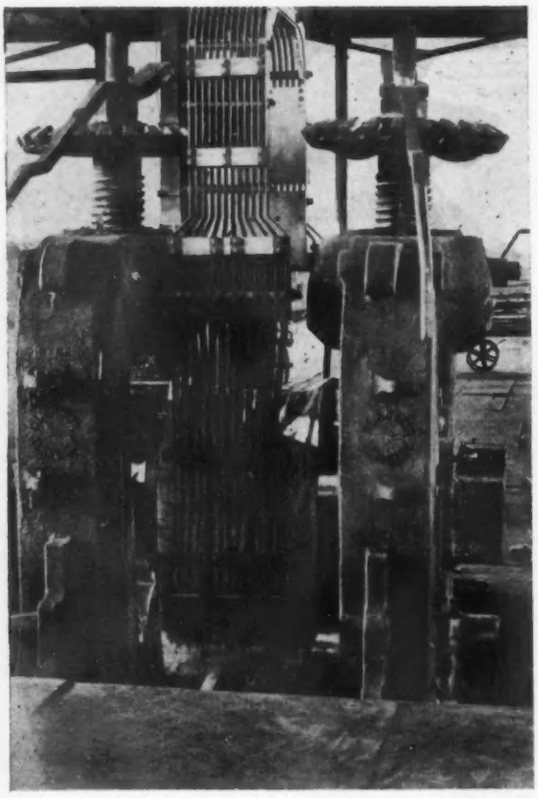
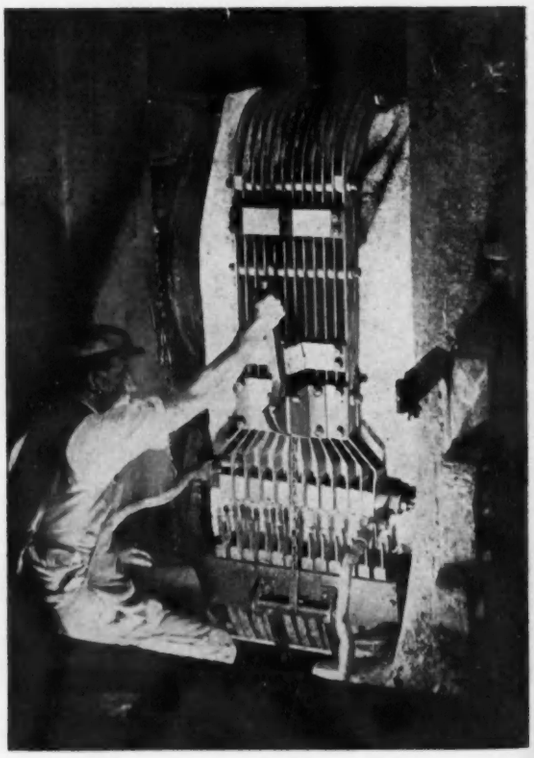


THE roll induction heater, comprising a group of conductors to encircle the rolls, is here being lowered into position.



THE lower ends of the conductors of the heater are connected by flexible cable and the final connecting-up requires the tightening of a single bolt.

Successful Finishing of Die Castings

By EDGAR PARKINSON and
FRANK V. FAULHABER

In the accompanying article attention is given to the details preparatory to application of the finish. Pertinent, technical suggestions and pointers for processing this work are set forth.

THE successful finishing of die castings is work beset with many problems. This is particularly true when the baking process is employed, because of the difficulty in making the finish adhere tightly to the product. In part this is due to the composition of the alloys used, in part to the smooth surfaces, and also to the oil, grease or grime that may be on the work incident to its machining and handling.

Baked Finishes Call for Special Precautions

Alloys of comparatively low fusing points are used as a rule in the production of die castings. For that reason additional difficulties sometimes crop up when baking methods are used for finishing.

The alloys entering into die cast work can be classified into four categories. There are the tin-base alloys, composed of 60 to 80 per cent of tin, 2 to 7 per cent of copper, 3 to 7 per cent of antimony, and sometimes a small percentage of lead.

Then there are lead-base alloys, consisting of 80 to 96 per cent of lead, 4 to 20 per cent of antimony, and sometimes as high as 10 per cent of tin.

Next we have zinc-base alloys, composed of approximately 80 to 95 per cent of zinc and small amounts of tin and copper, or aluminum and copper.

Finally, there are aluminum-base alloys, containing about 90 per cent of aluminum, mixed with small percentages of copper, nickel and silicon.

In the foregoing four groups of alloys it will be noted that all contain large proportions of metals which are themselves hard to finish. Trouble is often encountered, for example, in making a finish adhere successfully to zinc, lead or aluminum. This is due not only to the extremely smooth surface of these metals, affording no "grip" for the finish, but also to the inherent "greasy" quality of these metals.

Getting Rid of Entrained Gases

In addition to this, in the manufacture of die castings, small quantities of air or other gases are often entrapped in the metal. Later, if the die castings are baked, this air or gas is often driven out of the metal, which causes the formation of small pimples or blisters, on the surface of the finishing material.

It cannot be too strongly emphasized that the finishing department should at all times see to it that the work is perfectly clean. All traces of grease, grime, oil, and so forth, should be removed. The product should be handled no more than is necessary. Too often finger-prints are left upon the completed product. At times rejected work means lost future business.

Whether either baking or air-drying materials enter into the finish of the die castings, the ready-for-finishing work should show a clean surface. The cleaning can be accomplished by means of sand-blasting. This method not only removes the grease and oil, but also leaves or affords a slightly roughened surface, to which the finishing material will adhere much better than to a smooth, even surface.

In some plants the cleaning of castings is not performed as carefully and thoroughly as it should be. The castings are washed with naphtha and then dried with cloths. However, when this method is employed care must be exercised to frequently change the naphtha to prevent the concentration of oil or grease becoming sufficient to deposit a thin film on the work. Also, the wiping cloths should be discarded as soon as they begin to show any traces of oil or grease. Attention to these details will lessen the finishing difficulties that otherwise later might be encountered.

Caustic Solution for Cleaning Die Castings

A weak caustic solution can be employed to advantage, if proper care is exercised, when cleaning the die castings. The caustic will not only dissolve the grease and oil, but will also attack the metal slightly and produce an etched surface to which the finishing material will adhere. Precaution must be taken, however, that the castings be not left in the caustic bath longer than a few seconds, as the caustic will quickly dissolve aluminum, zinc and some of the other metals.

When withdrawn from the bath the castings should show a bright appearance. If a tarnished surface is shown, it indicates that the parts have been immersed too long, which will often cause pitting of the metal. The solution used should be maintained at a temperature of approximately 160 deg. F. to avoid any possibility of penetration into the pores of the metal. Due care in this will forestall perplexing and costly finishing troubles that many plants encounter.

Once the die castings are thoroughly cleaned, the finishing department is in position to produce quality finishing. There is no other preliminary work entailed when air drying finish is employed. It may not be amiss in this connection to state that many experienced finishers have found that the duller-drying finishing materials, incorporating considerable pigment, insure better results than glossy ones.

Pre-Baking Details

When baking of the parts is employed a special precaution must be taken, following the cleaning operation and preparatory to the application of the finish. Because of the air and other gases caught in the pores of the metal, it is desirable to first heat the castings to a temperature at least 15 or 25 deg. higher than that at which the finishing material is to be baked, holding this temperature for a period of 30 min. to one hour. This preheating removes any grease or oil remaining on the cast parts after cleaning, and also causes any gas or air entrained in the metal to break through the surface.

When pimples or pin heads can be found on the surface of the castings as a result of this treatment, these can be easily removed by sanding. When this preparatory procedure is disregarded, finishing difficulties are likely to ensue. When baking on the finishing material, there will be expansion of the entrained air or gas, causing small pimples or pin heads on the surface. However, if the castings are given the first coat as soon as they are cool enough after this preliminary heating, and then baked at a temperature slightly lower than that at which

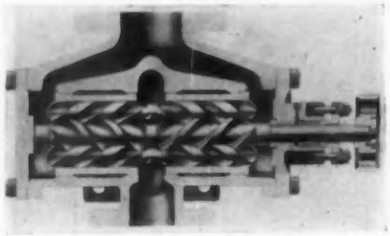
(*Concluded on Advertising Page* 14)

Rotary Displacement Pumps for Oil Burners

TO deliver oil to oil burners at constant pressure without pulsation, the De Laval Steam Turbine Co., Trenton, N. J., has built the pump shown in section in the accompanying illustration. It has been adapted for steam turbine drive.

One electric motor driven pump is designed to supply 2½ gal. per min. of bunker C oil at 100 deg. F. against a pressure of 100 lb. per sq. in., and is driven by a ½-hp. motor at 3450 r.p.m. This unit, exclusive of the motor, weighs only 15 lb.

A direct-coupled steam-turbine-driven unit has, at a speed of 3000 r.p.m., a capacity of 150 g.p.m. against 150 lb. pressure when pumping light fuel oil of 35 to 55 SSU. at 100 deg. F. In a unit with the speed reducing gear interposed between turbine and pump, the turbine runs at a higher speed, namely, 3500 r.p.m., which is reduced by a single helical gear in the ratio of 3.04 to 1. The pump, at 1150 r.p.m., has a capacity of 90 g.p.m. when handling a heavy fuel oil of viscosity of 1000 SSU. against 300 lb. pressure. The same pump is designed also for pressures as high as 500 lb. per sq. in.

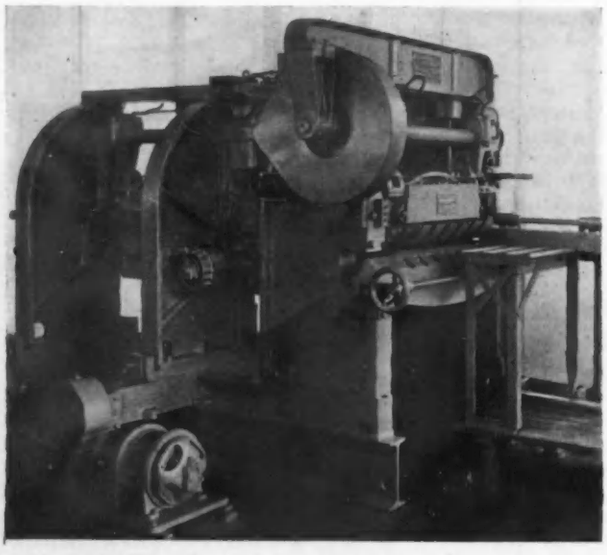


The De Laval rotary oil pump for turbine drive is double ended, receiving oil at the ends and delivering at the middle.

The pump of the directly connected unit is of the single end, single suction type, with all thrust in hydraulic balance; while that of the turbine driven gear unit is of the balanced opposed rotor type, as shown. Oil is received at the ends of the rotors and delivered from the middle. Only one stuffing box is required and that is under suction pressure only, provision being made for sealing where suction lift is encountered. Since the power rotor and the two idler rotors are double acting, there is no end thrust, except that due to the suction presure against the unbalanced area of the shaft driving the power rotor.

Shear Makes Multiple Cuts in Rapid Time

FOR multiple cutting of packs of tin plate, tack plate and similar products the Streine Tool & Mfg. Co., New Bremen, Ohio, has developed the machine shown. Its capacity is rated at 50 gross tons in an 8-hr. turn, with accurate square cuts and requiring only one shearman and one helper. The machine is designed also to shear pattern sheets from the pack to uniformly accurate sizes, with a minimum scrap. Adjustment of the multi-cut pack shears throughout the range of tin-mill sizes is emphasized as being a matter of a minute's time without requiring the operator's moving from his position.



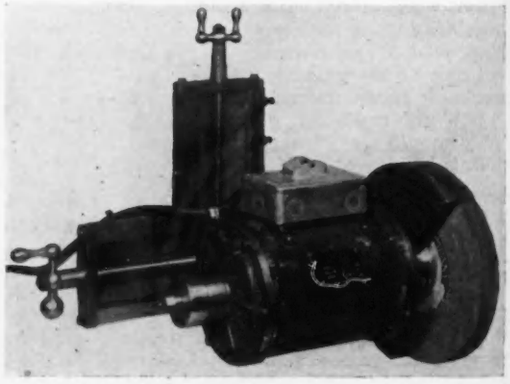
Streine Multi-Cut shear is rated to handle 50 tons in an 8-hr. turn.

New Angle Plate Grinder

SPECIAL roll or parallel grinding can be done economically with the angle plate grinder recently developed by the Standard Electrical Tool Co., Cincinnati. This unit is adapted for use on lathes, planers, boring mills and on milling machines for grinding large milling cutters. It may also be used for grinding shear blades without removing the blades from the machine in which they are used.

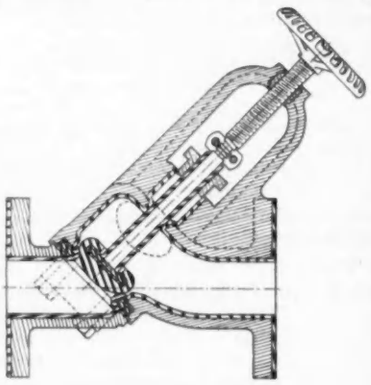
Four sizes, ½, 1, 2 and 3 hp., are made. The illustration shows the 2-hp. unit having a horizontal feed of 11 in. and a vertical feed of 6 in. The grinder can be arranged with longer or with shorter feeds, and also with one feed only. It carries a 12-in. diameter, 1¼-in. face grinding wheel, and is equipped with S.K.F. ball bearings mounted in dust-proof chambers. Rotating parts are balanced to eliminate vibration and increase the life. The machine weighs 193 lb.

THE angle plate grinder at lower right has both horizontal and vertical feeds.



Valve Is Rubber Lined for Corrosive Fluids

FOR handling corrosive and abrasive fluids under conditions of fairly high pressure, pulsating pressure, throttling or suction, a rubber-lined valve known as the Vulcalock has been designed by the B. F. Goodrich Rubber Co., Akron, Ohio. A resilient, rounded disk which snaps over a circular plate at the lower end of the valve stem provides the seal when brought into contact with a molded rubber-covered valve seat.



The lining of the valve is bonded to the metal parts by a patented process. The molded seat ring is double seated and reversible for double service. The body is cast iron, of two-piece Y-construction, designed to withstand working pressures up to 150 lb. per sq. in. The operating screw is of bronze, engaging a thread bushing of bearing bronze cast into the iron yoke.

High-Speed Hoist Has Safety Governor

A HIGH-SPEED hoist with patented safety overload governor is the most recent addition to the CM line of hoists manufactured by the

Hoist has safety overload governor besides adjustable brake to prevent self-lowering

Chisholm-Moore Hoist Corpn., Tonawanda, N. Y. Besides the safety governor there is an adjustable load brake to prevent self-lowering of load. Internal gears are packed in grease in an oil-tight, dustproof housing. The hoists are available in capacities from ¼ to 40 tons.

Compensated Air Cell for Potentiometers

A NEW type of battery has been developed to allow the Brown potentiometer pyrometer to record or control temperatures accurately without the necessity of frequent standardizing. According to A. H. Koch, development engineer of the Brown Instrument Co., Philadelphia, the potentiometer will operate at least one month without standardizing.

This Brown battery, which is shipped dry and to which drinking water is added, contains a coil to compensate automatically for surrounding temperature changes so that a constant current output can be depended on for use with potentiometers without requiring standardizing oftener than once a month.

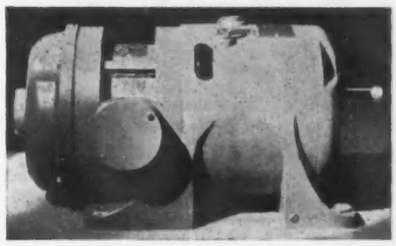
This new battery, known as the Brown compensated air cell, is a wet type non-rechargeable battery, which is shipped dry and rendered active by adding cool drinking water. It derives its name from the principle of air polarization, the oxygen being obtained from the air rather than from compounds within the battery.

The air cell is equipped with a built-in coil which automatically compensates for changes in the temperature surrounding the battery, so that, regardless of temperature changes, the cell may have a constant current output.

Large ampere-hour capacity is emphasized in respect to this cell, with resultant constant current output over long periods of time. Patents are pending on the internal automatic temperature compensator. It is claimed that the life of the cell is over 2½ years. It can be used with all types of Brown potentiometers.

Gearmotor Is Flexible in Output Shaft Positions

A LINE of gearmotors, by which is meant a combination of electric motor and speed reducer all assembled in a compact, protected unit, is a late creation of the Reliance Electric & Engineering Co., Ivanhoe Road, Cleveland. The gearing section is



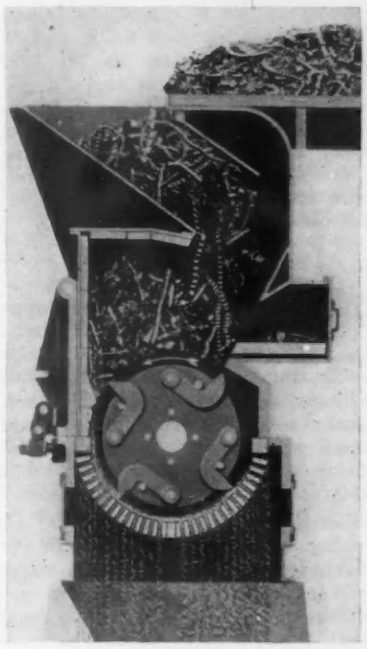
Reliance gearmotor has at one end a cartridge casting that houses the speed-reducing gears and may be rotated to bring the output shaft into the position desired.

carried in a cartridge, which can readily be removed endwise by taking out a number of cap screws. The removable feature of the single-piece cartridge casting provides for quickly altering the ratio of speed reduction, by changing the high-speed pinion and its mating gear, but it also allows for shifting the position of the output shaft. For example, on the smaller sizes, rotation of the cartridge provides for four shaft positions and in the larger for six to eight positions, an arrangement that makes for convenience in the installation of the gearmotor.

The unit is made in sizes of ¾ hp. upward, for direct and alternating current. The gear train comprises helical gears. As shown in the accompanying illustration, the design aims at giving substantial feet, cast integral, to the gear housing.

Turnings Crusher Has Safety Features

AN improved form of a metal-turnings crusher, built by the Jeffrey Mfg. Co., Columbus, Ohio, is shown in section in the illustration. The



Teeth of the Jeffrey Flextooth metals turnings crusher are kept in position by centrifugal force.

hammers are of the company's Flextooth type of construction, made of heat-treated cast steel with welded-on wear-resistant tips. The teeth are kept in position by centrifugal force but swing back when coming into contact with tramp iron, disappearing within the outer face of the roll.

The side and breaker-plate liners are of manganese steel and the breaker plate is equipped with the shear-pin type of safety bracket. All sizes have a patented design of metal catcher for receiving tramp metal which may accidentally be fed into the hopper. In addition to the metal catcher, the shear-pin safety device on the hinged breaker plate, as well as the drop bottom cage, operated by the attendant, serves as protection against heavy pieces of metal finding their way into the crusher.

A 2-cu. yd. gasoline-driven shovel is announced by the Northwest Engineering Co., 28 East Jackson Boulevard, Chicago. The power unit comprises a four-cylinder 8 x 9-in. Northwest-Twin City gasoline engine. The engine drive gears are mounted on ball and roller bearings and run in a bath of oil, and they have helical cut teeth. The shovel is equipped with crawlers for which positive traction is provided for both crawlers in turning. Both the boom and dipper sticks are of all welded construction.

Castings of Beryllium Alloys Win Several Different Uses

FIVE live topics were discussed at a unique meeting of the Hartford chapter of the American Society for Steel Treating at Hartford, Conn., Tuesday evening, May 9. It was the last technical meeting for the 1932-33 season. Five local metallurgists delivered short talks, followed by discussion and questions. The subjects were: Beryllium-copper, applications of spark testing, applications of magnetic testing, future of refined fuels and clean steel.

Beryllium-Copper Alloys

THE new alloys of beryllum-copper are creating keen interest. One of the American companies which is investigating these alloys is the Pratt & Whitney Aircraft Co., of Hartford. Some facts of the company's experience were related by H. J. Noble, one of the assistant metallurgists to H. J. Fischbeck, chief metallurgist.

Castings of beryllium-copper containing about 2.50 per cent Be are purchased in the "as-cast" condition from a foundry specializing in nonferrous alloys. By special heat treatment, unusual strength and hardness are obtainable.

The usual heat treatment is to anneal for one hour at 1450 to 1500 deg. F. followed by quenching in cold water. This puts the beryllium in solid solution. Then the alloy is subjected to a precipitation hardening treatment, it being of that class of alloys, such as those of aluminum and magnesium, which have that property. Depending on the temperature for heat treating (500 to 600 deg. F.) and the time of heating, various properties result. It is possible to obtain tensile strengths up to 150,000 to 180,000 lb. per sq. in. and a Brinell hardness of 350 to 400 by varying this treatment.

Castings of beryllium-copper, said Mr. Noble, are being used as sleeve bearings for a new adjustable Hamilton pitch propeller where there is to be as much as 6 deg. variation in rotation. The castings act as a bearing at the very high pressures involved. Increased speed is one result. Another aircraft company is using the alloy as valve guides because of its strength and its resistance to wear and heat.

Henry Ford is reported to be using this new alloy in breaker points. Because of its high resistance to impact, it is being incorporated in the firing pins of firearms. The ordinary pin of alloy steel does not last long, said Mr. Noble, not more than 33 min., while one of beryllium-copper has stood up 7 hr. in a rapid test. Nonsparking tools are also a feature, such as cold chisels, drills, saws, etc.

Attention was called to the electrical conductivity of the alloy—higher than steel but lower than copper—which insures its use in electrical appliances. Relay contact tips made of it have shown long life. Its resistance to corrosion has been established and it is easy to machine even after final hardening heat treatment. Springs made of it have unusually long life, said Mr. Noble, and it can be soldered and braised.

In the discussion, it was brought out that a "master alloy," containing about 12.5 per cent Be and the rest copper, is being produced by the Beryllium Products Corpn., New York, and an imported German product is also on the market. While its present cost is high, it is expected that this will come down as progress is made in the refining of the ore on a larger scale. This was true of aluminum, magnesium, vanadium and molybdenum.

The 12.5 per cent alloy is introduced into the molten pure copper to produce the 2.25 per cent beryllium-copper product. Great care is necessary in regulating the temperatures of melting and pouring. It was also pointed out that the alloy has marked bearing properties under high pressures.

Attention was called to a beryllium-nickel alloy of about 12.5 per cent Ni as available on the market and that some developments in this field, similar to those in copper, are not unlikely. As was emphasized by Mr. Noble in his brief address, the development is so new that much has yet to be learned, but enough is known to assure industry that these alloys have many valuable industrial properties.

April Structural Bookings Show 46 Per Cent Decline

Structural steel bookings during April showed a decline of 46 per cent under the bookings of the previous month, according to first check by American Institute of Steel Construction. March bookings were large because a number of important public projects were let at that time. The activity in private work during April showed a healthy increase over previous months of the year.

A total of 108 companies, representing 70 per cent of the industry by volume, reported that they had booked during April 33,174 tons and had shipped 38,260.

Steel Bridge Design Prizes Awarded

George D. Recher, a student at the Atelier Adams-Nelson, Chicago, won first prize in the 1933 annual bridge design competition held by the American Institute of Steel Construction. W. A. Smith, from the University of Alberta, Canada, won second prize. First honorable mention was given to W. M. Horowitz, of the University of Illinois; second honorable mention to Robert G. Jahelka, of Columbia University, and third honorable mention to Leonard E. Palumbo, of the New York Architectural Club.

The problem was to design a steel highway bridge, crossing a deep gorge with precipitous rock walls. In addition to giving the students engraved certificates of award, the first prize this year carries a cash compensation of $100 and the second prize a cash compensation of $50.

These awards were made from the ten best designs selected in a preliminary competition when 134 students from 41 different schools and colleges entered drawings. The jury of award consisted of Leon S. Moisseiff, consulting engineer of New York; Edward A. Byrne, chief engineer of the Department of Plant and Structures of the City of New York; William F. Lamb, architect of the firm of Shreve, Lamb & Harmon, New York; Kenneth M. Murchison, architect of New York, and H. H. Saylor, editor of *Architecture*.

Program for Steel Warehouse Meeting

The program for the twenty-fourth annual meeting of the American Steel Warehouse Association, May 23 and 24 at Hotel Commodore, New York, has been completed.

The advertising committee has arranged to present a folder designed to assist warehouse distributers in securing a larger share of the available business. Advices received from mill executives and warehouse distributers indicate a large attendance.

Among the features on the program is an address by Alexander S. Banks, director of Chemical National Bank and Trust Co., who will talk on banking and business conditions.

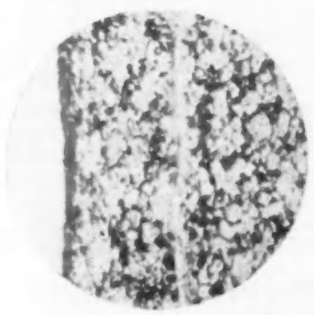
In addition, the hot rolled steel committee, the sheet steel committee and the cold finished steel committee all have important questions to bring before the meeting.

Republic Steel Corpn. has moved its Southwestern sales office from Dallas, Tex., to 2322 Gulf Building, Houston, Tex., N. J. Clarke, vice-president in charge of sales, has announced. R. E. Lanier, district sales manager, and his present staff will be in charge of the Houston office.

Nickel-Clad Steel Sheets, Strip and Wire

NICKEL-CLAD steel sheets and strips have been placed on the market by H. Boker & Co., Inc., 101 Duane Street, New York, and may be obtained with the nickel on one or on both sides. Steel wire clad with nickel is also one of the new Boker products.

The nickel-clad thin material is expected to win a definite field of usefulness in the process industries, such as chemical, textile and food handling lines, and in general where resistance to corrosion is paramount. It is expected also to find uses where appearance and lustrous color are important, as for soda fountain and restaurant installations and in architectural applications, including building trim and inside and outside embellishment. A promising avenue of consumption is



This photomicrograph at 750 diameters shows the bond between the nickel and the steel.

believed to lie in their use for containers for handling substances noted for chemical or corrosive activity. In short the material appears to extend the range of available nickel-clad steels from the nickel-covered plates made by the Lukens Steel Co., for heavy tanks, pressure vessels and the like, to nickel-protected flat-rolled steel for vat linings and for all sorts of articles formed by stamping, pressing, drawing, spinning and welding processes.

These nickel-clad sheets and strips have been made by the Fleitmann process for some 50 years. Until recently the uses have been confined to specialized lines both in Europe and America, such as cooking utensils and chocolate molds. Owing to the adoption and development of nickel and stainless steel in both solid and clad form by a large number of American industries, a large latent demand is envisaged for the thinner gages of pure nickel-clad sheets and strips.

In the Fleitmann process the nickel is hot welded at incipient fusion under high pressure and conditions which eliminate oxidation and sulphurization. Photomicrographs and laboratory and practical fabrication tests over a period of years show a uniform and permanent bond between the nickel and steel.

Sizes and gages offered are as follows:

Hot-Rolled, Annealed and Pickled Sheets
Widths up to 59 in.; thickness from No. 14 U.S.S. gage up to 3/16 in.

Cold-Rolled, Annealed Sheets
Widths up to 50 in.; thickness from No. 28 to No. 10 U.S.S. gage.

Cold-Rolled Strip, Annealed
Widths up to 12 in.; thickness from 0.010 to 0.059 in.

The cold-rolled material in sheets and strip can also be supplied with polished finishes. All of the above forms can be furnished with a nickel cladding of 2½, 5, or 10 per cent on either or both sides.

The mill is also arranging to supply nickel-clad wire with 10 or 20 per cent cladding.

The nickel-clad sheets, strips and wire lend themselves to fabrication in all forms, in a manner similar to sheet steel fabrication. The same tools and equipment can be used. The nickel-clad material, it is pointed out, for example, can be welded, soldered, drawn, brazed, spun, hot worked, beaded and polished.

The material can also be annealed as many times as necessary without damage or effect to the nickel surface and can be brought up by subsequent operations to a high polish. The Boker company is now compiling data for guidance of the fabricator. The percentages of nickel in the cladding should provide an ideal base for chromium-plated work, where such finishes are desired.

Owing to the physical properties, the strength of the steel and the corrosion resistance of the nickel and its relative price position, the nickel-clad material is expected to establish a definite position in the field of industrial metals. There will likely be varying readjustments among installations and uses, on the one hand of solid metal, such as pure nickel, monel metal, stainless steel, nickel silver, and, on the other hand, of metals such as copper, tin-copper, galvanized iron and enameled steel. There may easily also be realinements in the use of glass linings, rubber linings and plastic coatings in various forms of industrial equipment.

Interpretation of New York Sales Tax

MARK GRAVES, Commissioner of Taxation and Finance of the State of New York, has given his interpretation of the scope of the recently instituted sales tax as applied in that State and as related to the metal-working industry. The interpretation is based upon specific cases submitted by the Editor as typical.

Our questions and his answers are as follows:

First question:

"Will the State sales tax apply in any way to capital goods or to goods used in further processing or in construction work, even though such goods may be sold 'over the counter'?

"For example, would a sale of galvanized sheets to a home owner for roofing a shed or a barn be considered a retail sale and therefore become taxable? If galvanized sheets were sold to a contractor for work on a building which he was constructing only as the contracting agent, would this be considered a retail sale?"

The answer is "Yes."

Second question:

"How about a machine tool, an electric motor or any other piece of equipment used in manufacturing work, sold from a New York stock to a shop which was to use this equipment for manufacturing purposes? Is this a wholesale or a retail transaction?"

The answer is: "This is a retail sale and taxable."

Third question:

"We assume that a machine tool sold by a manufacturer in another state to a manufacturer in New York State is interstate commerce, and therefore not taxable, but if the same machine tool was stopped on the way and became part of a New York State tool dealer's stock before being sold to its ultimate user, would this change the status of the transaction so that in any sense it would come under the State sales tax law?"

The answer to this question is "Yes. When goods shipped into the State have come to rest and been mingled with a dealer's stock or merchandise and is thereafter sold at retail, our sales tax applies to such a sale."

Fourth question:

"Steel pipe is commonly sold out of jobbers' stock, it undergoes no further manufacturing. Sales are made to building contractors, to public utilities, to railroads, etc. If pipe were sold by a jobber for direct laying, say by a public utility, would this be a retail transaction?"

The answer to this question is "Yes."

Fifth question:

"Would steel rails sold by a rail mill at Buffalo to a New York State railroad for laying within the State of New York come under the heading of a retail or wholesale transaction, considering that the rails go direct from a producer to a user, and undergo no further manufacturing?"

The answer to this question is "That the sale would be a retail sale within the definition contained in the sales tax act and would be subject to that tax."

... PERSONALS ...

HERBERT H. MOSS, who was awarded the Samuel Wylie Miller Memorial Medal at the recent annual meeting of the American Welding Society, as announced in THE IRON AGE of May 4, is associated with the Linde Air Products Co., New York. He has studied a variety of problems relating to the use of oxy-acetylene welding and cutting in structural work, oil and gas transmission lines and in transportation, particularly freight cars and shipping containers, and has latterly been identified with the development of flame machining, in which an oxy-acetylene flame is used for cutting, boring and shaping metal parts. In 1931 he assisted the technological developments committee of President Hoover's Conference on Home Building and Home Ownership and contributed a paper on the use of welding in small-house construction. Mr. Moss is active in the work of the American Welding Society, American Bureau of Welding and the International Acetylene Association. He is also a member of the American Society of Mechanical Engineers.

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MYRON C. TAYLOR, chairman of the board, United States Steel Corpn., recently sailed for Europe. He will return early in June.

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M. V. DREYSPOOL, for the past 10 years manager of sales for the Erie Steel Barrel Co., Erie, Pa., has resigned. He will continue his other lines at his office at 299 Madison Avenue, New York.

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L. D. DODSON, who has been identified with the Wyandotte, Mich., office of the J. B. Ford Co., has been placed in charge of the New York office of the J. B. Ford Sales Co. H. S. CLINE, formerly New York manager, has been detailed to special work on national accounts, with headquarters in New York. R. D. SHERWOOD, manager of the Cleveland office, will take Mr. Dodson's place at Wyandotte. G. T. ROBINSON, who has been assistant manager of the Cleveland office, has become manager.

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J. E. OTIS, JR., has been appointed general manager of the Stewart-Warner Corpn., succeeding W. J. ZUCKER, who has resigned. Mr. Otis was formerly general manager of the Alemite Corpn., a subsidiary company. FRANK A. HITER, formerly sales manager of Alemite, was recently made general sales manager of Stewart-Warner and subsidiaries.

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DR. COLIN G. FINK, secretary of the Electrochemical Society and professor of electrochemistry at Columbia University, was given the Goodrich Acheson Medal for his work in electrochemistry at the annual spring meeting of the society last week in Montreal. DR. JOHN JOHNSTON, director of research of the Kearny, N. J., laboratories of the United States Steel Corpn., was elected president of the society. PROF. H. S. LUKANS, of the University of Pennsylvania; E. F. CONE, of New York, and S. C. BLAYLOCK, of Trail, B. C., were elected vice-presidents.

H. H. MOSS

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HENRY E. HUND has resigned as vice-president and general manager of the Briggs Mfg. Co., Detroit.

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HENRY SCARBOROUGH, president, Twentieth Century Machinery Co., Milwaukee, has been elected president of the newly organized Milwaukee chapter, National Institute of Manufacturers and Distributors, organization of equipment suppliers to the brewing industry.

OBITUARY

WILLIAM H. HASSENPFLUG, former vice-president, Harnischfeger Corpn., Milwaukee, died May 8, aged 69 years. He was born in Mifflinburg, Pa., and was graduated from Bucknell University. He entered the machinery industry with William Sellers & Co., Inc., Philadelphia. In 1900 he went to Milwaukee to join the Pawling & Harnischfeger Co. and became vice-president the following year. He resigned in 1913 to engage in tractor manufacture, but returned to the Harnischfeger Corpn. in 1923 as vice-president in charge of excavator sales, retiring a year ago because of failing health.

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FRANK M. FARBER, president of the Marshalltown Mfg. Co., Marshalltown, Iowa, maker of shearing machinery, died at a hospital in that city on April 27, aged 61 years. He was at one time manager of the Bogardus-Nelson Co., and when that company consolidated with the Lennox Throatless Shear Co. in 1918, he became secretary and manager. He later became president of the company.

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RALPH H. TATE, until recently vice-president of the Fort Pitt Spring Co., Pittsburgh, died suddenly in that city on May 5, aged 50 years.

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WILLIAM J. PERKINS, president, Perkins Machine Co., Milwaukee, specializing in the design and manufacture of ore mining equipment, died suddenly of a heart attack, May 2, aged 49 years. After spending the earlier years of his life in copper mining in the upper peninsula of Michigan, he went to Milwaukee in 1926 to engage in manufacturing.

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ALEXANDER S. VAUGHAN, vice-president, Vaughan & Bushnell Mfg. Co., Chicago, manufacturer of hardware, died May 13 at Oak Park, Ill. He was a graduate of the University of Chicago.

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WILLIAM J. BURLEIGH, manufacturer of ornamental iron at Sterling, Ill., died of heart disease on May 11, aged 66 years.

Conference Board Survey Shows Price Declines Vary

Business difficulties arise not merely from a fall in general prices, but from variations in the fall of prices of different commodities or groups of commodities. The National Industrial Conference Board points out that there are prices for commodities at wholesale, for commodities at retail, and prices for services, that these classes have not fallen in the same measure, and that within each class the component elements show divergent degrees of price decline.

The Conference Board has computed for 715 comparable price quotations the percentage changes from the 1929 average to the prices of January, 1933. This shows that only 103 articles, or 14.4 per cent of the whole number, fell approximately at the general average rate of 36 per cent. Almost three times as many, or 302 articles, fell 40 per cent or more; 246 articles fell less than 30 per cent and 64 articles remained stationary or increased in price.

Equally striking are the price changes when groups of commodities are analyzed. In a group of 67 farm products, 50 recorded price declines ranging from 40 per cent to 69.9 per cent. In a group of 122 items of food, 86 registered declines of more than 40 per cent and less than 70 per cent. In metals and metal products, out of 125 items, only 18 declined 40 per cent or more, while 6 showed increases.

OFF THE ASSEMBLY LINE

Automobile Plants Increase Output; Heavy Steel Releases Expected

DETROIT, May 15.

RETAIL motor car sales this month are running ahead of even the most optimistic predictions of the industry's sales executives, with the result that production schedules in several cases have been increased during the past week. Automobile plants have intensified their pressure upon steel mills to secure quick delivery of materials. It is believed that large steel tonnages will be placed in the next two weeks by automotive users to cover requirements for the early part of June. Despite recent heavy specifications, there is slight indication of forward buying on the part of motor car makers, who are holding purchases close to immediate needs and are doing little if any speculative ordering in anticipation of third quarter production. In some instances steel stocks have been expanded, but only within relatively narrow limits. That the large quantities of steel now moving into the southern Michigan district are being fabricated almost as soon as received is one of the most encouraging facts.

With the three major manufacturers — General Motors, Ford and Chrysler—turning out about 170,000 cars this month, assemblies by the entire industry of at least 200,000 cars seem assured. Chevrolet's sales have been so large that its output has been pushed to a still higher level and may touch the 70,000 mark in May. The remainder of the General Motors divisions will make a total of about 19,000 units. Plymouth still has as its goal 26,000 cars this month with the other Chrysler divisions aiming at 13,000 to 14,000 cars. Ford probably will assemble 50,000 units. Hudson has boosted its factory operations to 2000 units a week, the best rate since June, 1931, as against a previous schedule of 1200 to 1500 units. It now has 8000 men on its payroll working five days a week.

Plymouth Expands Plant Capacity

Plymouth is finding its plant facilities inadequate for its growing requirements and consequently has taken steps to raise the manufacturing capacity of its Mount Elliott Street plant from 1300 to 1600 cars a day. This program included an expenditure the past week of approximately $70,000 for machine tools. This represents the first sizable purchase of machine tools by the automobile industry since Ford started to tool up for its present V-eight car. To make way for Plymouth's expansion the production of the De Soto car is being moved to Chrysler's Jefferson Avenue plant, where the Chrysler car is made.

The more-than-seasonal spurt in retail automobile sales, which probably will be sustained at fairly good levels during the summer months, has lifted the hopes of the machine tool trade. Six weeks ago indications were that motor car makers, wishing to conserve their resources, would go through the latter half of the year adapting their present equipment to their 1934 jobs. This picture is entirely changed today. The automobile industry is witnessing the release of the long pent-up demand for motor cars and is confident that this flow of business will decrease only gradually during the next three months. People are spending their hoarded money, stocks and bonds have risen sharply in value, and commodity prices, especially of agricultural products, have ascended. All of these factors, together with the fact that for several years cars have been scrapped in far greater numbers than they have been built, are convincing evidence in the eyes of automotive executives that retail sales will continue in relatively good volume. This in turn has altered the outlook for next year. Extensive changes in mechanical design are now being contemplated. Plant rehabilitation is in order, especially in the case of several factories which have spent scarcely a penny for machine tools since 1928 and 1929. A few live inquiries already are engaging the attention of machine tool dealers. One prominent machine tool builder, a visitor in Detroit the past week, was so impressed with the possibilities for business in the automotive industry that he is starting to set his plant in order in anticipation of a sharp increase in orders during the latter part of the year. Incidentally, the tremendous stocks of used machinery which automobile companies now possess are not expected to stand in the way of new machine tool buying. A large percentage of this equipment is so obsolete that its further use is considered remote. Since production economies will be stressed perhaps more than ever before, the automotive industry has no other alternative than to turn to the ordering of new equipment to achieve its purpose. Machine tool dealers believe that buying of machinery preparatory to tooling up for next year's models will begin in July.

Detroit Notes

Great Lakes Steel Corpn. continues at 100 per cent of ingot capacity, with its finishing mills also running close to full capacity. . . . Hanna Furnace Corpn. is relining one of its blast furnaces at Zug Island. It likewise is building a slag plant to prepare the slag from its blast furnaces for commercial consumption. . . . Oldsmobile sold 3776 cars in April, the highest total in the last 21 months. . . . Car dealers throughout the country are in excellent condition so far as used car stocks are concerned. For instance, Oldsmobile dealers have 5147 less used cars on hand today than they had a year ago. . . . Auburn will treble its production this month compared with May, 1932. . . . Assemblies of the Pontiac car at the Tarrytown, N. Y., plant of the Chevrolet Motor Co. will begin June 1 with 2500 cars scheduled for the first month. Pontiacs have been assembled at Chevrolet's Oakland, Cal., plant for the last year. The use of other Chevrolet assembly plants is contemplated, although the Pontiac, Mich., factory will continue as the chief manufacturing point. It will be recalled that the Pontiac company has been under the guidance of W. S. Knudsen, Chevrolet's chief, during the past year. Many of Pontiac's parts, such as the cylinder block and other cast and forged parts, are

now made in Chevrolet plants. . . . Ford at least temporarily is reported to have concentrated assemblies at eight of its 32 assembly plants. . . . General Motors export sales in April amounted to 12,725 units, as against 9330 in April, 1932, a gain of 36 per cent. In the first four month of 1933 export sales totaled 44,890 units, compared with 41,282 in the same period of last year. . . . The Dodge truck plant is working six days a week, nine hours a day. . . . Briggs is now employing 11,000 men five and a half days a week. In addition to automobile bodies it is making 400 refrigerator cabinets a day for a Chicago firm as well as steel sinks and steel chairs. . . . Plymouth has on hand unfilled orders for $10,000,000 worth of cars. By the end of May it will have sold $30,000,000 of its recently introduced models. . . . The McCord Radiator & Mfg. Co. is making as a side-line an "electric towel" which blows hot air on hands and face as a substitute for an ordinary towel. It also is making a rustless steel, flexible ice tray. . . . Ford is advertising for the first time in more than a year. Arthur Brisbane's recent assertion that Ford would surprise the world with a new car in the next 90 days has caused considerable comment locally, but there is little evidence to support this story. Practically all equipment for tooling up for the small job is still held up. . . . Continental has added a deluxe series to its four-cylinder Beacon car. . . . Cord Corpn., including its Auburn and Lycoming divisions, has raised wages 5 per cent.

April Tool Index Shows a Slight Upturn

The index of machine tool orders gained 2.8 points in April, increasing to 16.2 as compared with 13.4 for March, according to the current report of the National Machine Tool Builders' Association.

While the effect of business revival has not as yet been felt by builders of machine tools in the same measure as by some other industries, the outlook for new orders is now considered to be brighter.

Simplification Program for Copper Wire Nails

A proposed simplified practice recommendation covering copper wire nails has been mailed to the industry by the division of simplified practice, Bureau of Standards, for consideration and written approval.

This recommendation, which was proposed and formulated by representatives of the industry, is concerned with the length designation and decimal equivalent, in inches, together with the gage of common copper wire nails and copper wire slating nails.

British Steel Output Increasing; Germany Considering Lower Wages

LONDON, ENGLAND, May 15 (*By Cable*). — With Continental semi-finished steel no longer competitive, British steel output is increasing and the outlook is considered healthier. Declining pig iron stocks are regarded as an encouraging factor.

Tin plate prices are firm on a rising tin price, but business is still slow because of an attitude of caution on the part of consumers. Considerable inquiry has developed, including some for the last half of 1933. Broken Hill Proprietary Co., Ltd., has agreed to postpone the erection of proposed tin plate mills in Australia for the time being and it is unlikely that tin plate will be manufactured at this source for at least two years.

British blast furnaces are expecting increased business with Denmark, following the completion of the Anglo-Danish agreement, and makers are already quoting for export at prices below cost.

Export steel demand is broadening, with Canada and China showing signs of renewed interest.

German, French, Belgian, Saar and Luxemburg steelmasters are reported to have signed an agreement establishing international sales offices covering semi-finished steel, beams, bars, plates and heavy sheets for a period of five years commencing in June. This agreement evidently contains certain provisos, and prices are not as yet established, the works in the meantime asking higher prices.

In view of these uncertainties, Continental steel is quiet, awaiting the fixing of prices by the new selling agencies at the Paris meeting on May 20.

Headquarters of the new agencies have been fixed as follows: Steel bars at Luxemburg, beams at Paris, semi-finished steel at Liege, sheets at Düsseldorf.

Belgium is considering the establishment of a scrap iron office to regulate supplies for export. Poland is endeavoring to arrange a barter agreement with Brazil for 17,000 tons of rails for Brazilian coffee.

The South African Iron & Steel Industrial Corpn., Ltd., expects to begin operations in January of next year.

April exports of British pig iron were 17,000 tons, including 800 tons exported to the United States. Total British exports of iron and steel for April were 133,000 tons.

The Continental Hoop Iron Cartel is now functioning and prices are quoted at £3 12s. 6d., c.i.f.

The German Government has appointed an iron and steel commissioner to rearrange the relations between the producing and consuming industries. Lower wages are favored to assist German manufacturers to meet world competition.

Export quotas have been reduced by the International Rail Makers' Association by 6 2/3 per cent.

British Prices f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9		
Billets, open-hearth	£5	to £5 7s.	6d.
Black sheets, Japanese specifications	£11		
Tin plate, per base box	16s.	3d. to 17s.	
Steel bars, open-hearth	£7	17½s. to £8	7½s
Beams, open-hrth.	£7	7½s. to £7	17½s
Channels, open-hearth	£7	12½s. to £8	2½s
Angles, open-hearth	£7	7½s. to £7	17½s
Black sheets, No. 24 gage	£8	10s.	
Galvanized sheets, No. 24 gage	£10	10s. to £10	15s.

Continental Prices f.o.b. Continental Ports

Per Metric Ton, Gold £ at $4.86

Billets, Thomas	£2	7s. to £2	9s.
Wire rods, No. 5 B.W.G.	£4	10s.	
Black sheets, No. 31 gage, Japanese	£11	5s.	
Steel bars, merchant	£2	17s.	
Beams, Thomas	£2	12s.	6d.
Angles, Thomas 4-in. and larger	£2	16s.	
Angles, small	£2	18s.	
Hoops and strip steel over 6-in. base	£3	12s.	6d.
Wire, plain, No. 8	£5	7s.	6d.
Wire nails	£5	15s.	
Wire, barbed, 4-pt. No. 10 B.W.G.	£8	15s.	

April Shows Decrease In British Steel

LONDON, ENGLAND, May 12 (By Cable). — A slight decrease in the British production of both pig-iron and steel ingots was shown in April, as compared with March. Monthly totals for 1932 and 1933 were as follows:

	Pig Iron	Steel Ingots
1932		
Jan.	332,400	429,700
Feb	318,100	480,600
March	335,600	462,800
April	316,900	433,300
May	315,300	416,900
June	311,400	459,300
July	292,600	430,300
Aug.	259,400	361,500
Sept.	260,400	430,300
Oct.	275,600	438,500
Nov.	267,700	473,800
Dec.	284,500	430,400
	3,569,900	5,247,400
1933		
Jan.	286,600	444,400
Feb.	270,800	482,700
March	332,200	577,700
April	324,700	513,300

Discuss Product Redesign As Means of Lowering Cost

REORGANIZING production methods and "reengineering" to increase efficiency, the utilization of newly devised equipment, restyling, and other problems relating to the modernization of production and reduction of costs were discussed at a conference held at Case School of Applied Science, Cleveland, May 11 and 12. The program was arranged by the school with the assistance of an advisory committee consisting of representatives of national engineering societies that are affiliated with the Cleveland Engineering Society.

In an address on "Net Profits From the Selection of Equipment," H. P. Bailey, Warner & Swasey Co., Cleveland, pointed out that the major problem today is to cut the cost per piece in the face of diminished volume of production. As the factory executive turns to the purchase of new equipment to solve his production problems he meets with financial objection on the part of his treasurer or chief executive, for today in most cases the chief executive controls equipment buying directly or definitely. If the factory executive is to succeed in getting new equipment, he must justify the expenditure to the chief executive by facts and figures. He must demonstrate the ultimate net profits which will result from the purchase of equipment under existing conditions.

His buying method, Mr. Bailey said, should meet three requirements: 1. The method should face the facts of diminished volume of production and estimate the savings from new equipment on the basis of present activity. 2. The buying method should evaluate the savings effected from the new equipment in dollars and cents and should visualize the opportunity for net profits which will arise from the purchase of equipment to reduce cost. 3. The buying method should present in summary form an answer to the question, "How long will it take for the equipment to pay for itself?" and "What percentage of net profits will the investment return?"

Explains W. & S. Method of Figuring Equipment Replacement

Mr. Bailey followed with an outline, illustrated with tables and charts, of the method for the purchase of industrial equipment developed by the Warner & Swasey Co. several years ago and since followed. (This was described in detail in THE IRON AGE Dec. 8, 1932 p. 878.)

Economies Made Possible by More Accurate Forgings

New methods in the forging industry that have been made possible by equipment of new design and which have resulted in a reduction of production costs were discussed by Charles D. Harmon, National Machinery Co., Tiffin, Ohio. His talk was illustrated by motion pictures of operations and lantern slides showing forgings that are being produced by the methods described. Greater accuracy has been attained in the manufacture of forgings because of the rigidity of machines and the elimination of spring. Then a supplemental machine was conceived for coining forgings to make them so accurate that they would require little or no machining, a machine of this type being the Maxipres built by the National Company. With such equipment uniformity of parts is assured, said Mr. Harmon, and if close limits are required chucking operations are greatly reduced. When close tolerances are not required finishing operations are not necessary. The coining operations are done when the metal is either at a low temperature or cold. Forgings of non-ferrous metals, malleable irons, and some steel forgings, can be made on this press, he said. Efficiency is further increased by automatic handling with fingers and with full-automatic transfer. Illustrations of parts coined and forged on the Maxipres included automobile brake drums and shoes, drop forge connecting rods, coining of this part resulting in the elimination of milling, ring gears for automobile starters and brass castings used in the plumbing industry.

Stampings Used in Redesigned Products

The place of stampings in the product was discussed in a paper prepared by J. K. Olsen, Stewart-Warner Corpn., Chicago. In Mr. Olsen's absence the paper was read by title. The author referred to advantages in the use of stampings, the progress made in the development of materials suitable for stampings, and the progress made in die making, mentioning in this connection progressive dies.

Redesign of product to use stamped parts to lower the cost is now an every-day occurrence, he declared, and great ingenuity is being employed in this redesigning. Progress in manufacturing methods, such as electrical welding, is also contributing to increased use of stampings. However, there are other methods, such as casting and forging, that are favored for making certain parts, he said. For example, it is sometimes advantageous to use a die casting for a small frame with a large number of bearings or tapped holes, thus having a single part instead of a number of parts and often a more compact unit. As a rule stamping is the cheapest way a part may be produced, he contended, and uses less material than parts made in other ways. Another reason why stampings are preferred, the author said, is the ease with which features such as hubs may be drawn or dowels may be located in a part. In addition, in modern stamping practice there is the convenience of incorporating such operations as swaging, upsetting and heading.

Welding and the Reengineering Program

In the reengineering of industry the design and production of welded metal construction will have to be considered, declared R. E. Kinkead, consulting engineer, Cleveland, in a paper on the influence of welding on design and production. Welded construction costs less in many cases in the sense of cost of using and where it does cost less it must be used, he insisted. Developments of welded construction for pipe lines were mentioned by the author as an example of reengineering that has reduced the cost of transportation.

While welding may be an incidental matter in reengineering, a certain amount of background is necessary to establish its relationship to other branches of engineering. What engineering practices will be the most important will not be apparent until the foundations of a reengineering program are laid and some constructive work actually done. Reengineering should cure industrial management of the folly of trying to sell what its plants can build rather than trying to supply wants at a price the customer can afford to pay.

Arrangement of Equipment Important

Arrangement of plant equipment is as important as any other factor in determining whether the plant is to show a profit or loss, declared R. A. Fintz, engineer, White Motor Co., Cleveland, in a paper on changes in plant layout for varying production. In this he described the plant layout of the White Company.

The speaker pointed out respective advantages of grouping machines according to class of work or having in one group all the equipment required for making a certain unit. Which plan is most economical depends upon the product that is being manufactured, he said. The manufacturing units at the White plant are self-contained except the heat treating and some special process departments. Screw machine and sheet metal work is done in separate departments. The speaker said that recently the White Company decided to make its axle department 100 per cent self-contained and rearranged the equipment for progressive operations. This resulted in a 12 per cent increase in efficiency. Then a group piece-work plan was adopted and the efficiency of each man was further increased over 20 per cent.

Formerly there was a grinding department for the entire plant, but this

department was broken up and the machinery was distributed to other departments. The result was the elimination of much trucking and better production control. Although the company makes 30 models, the plant being classed as a jobbing shop, its machines are arranged for straight-line operation. Single-purpose machines are generally used. In spite of the great number of models the chassis erection department is so arranged the chassis for all models are erected over one power assembly line.

Redesign to Increase Sales Appeal

Redesign of a product to increase appeal to the purchaser was discussed by R. E. Hellmund, chief electrical engineer, Westinghouse Electric & Mfg. Co. Designing for this purpose is more necessary than ever before, he declared. Many products have qualities such as serviceability and low first cost that are now taken for granted, and the most promising possibility for increasing sales appeal seems to be through greater convenience and better appearance. The engineer and designer should size up the market as it exists and as it is expected exist in the near future and then to determine where he must put the principal emphasis in his redesign to obtain the maximum amount of sales appeal. The designer must keep a close watch on all new developments, both in his own and in outside arts, as they present new opportunities to introduce features giving sales appeal. As an example of this he referred to chromium plating. The speaker warned against too radical changes in design, saying that unless changes made at one time are moderate they will not meet public approval.

Unfilled Steel Orders Gain 23,572 Tons

Unfilled orders of the United States Steel Corpn. increased 23,572 tons in April, registering the first gain since October, 1932. The total on April 30 was 1,864,574 tons, compared with 1,841,002 tons on March 31. Unfilled orders at the end of each month since 1930 follow:

	1933 Tons	1932 Tons	1931 Tons
January	1,898,644	2,648,150	4,132,351
February	1,854,200	2,545,629	3,965,194
March	1,841,002	2,472,413	3,995,330
April	1,864,574	2,326,926	3,897,729
May	.....	2,177,162	3,620,452
June	.....	2,034,768	3,479,323
July	.....	1,966,302	3,407,816
August	.....	1,969,595	3,169,457
September	.....	1,985,090	3,144,833
October	.....	1,997,040	3,119,432
November	.....	1,968,301	2,933,891
December	.....	1,968,140	2,735,353

Negotiations have been completed for consolidation of the Carnegie Dock & Fuel Co. and the Northern Coal & Dock Co., both of Minneapolis. The merger will become effective June 1.

Canada and France Agree to Reciprocal Tariff Reductions

WASHINGTON, May 16.—Reciprocal reductions in duties are provided in an exchange between France and Canada under a one-year commercial convention signed at Ottawa, May 12, according to a cable from Commercial Attache Lynn W. Meekins, Ottawa. Since the Franco-Canadian commercial treaty of June 17, 1932, was terminated the general or highest duties have prevailed on imports of each country.

Ferroalloys and machinery are included in the latest arrangement giving in all 185 Canadian products the French minimum duties and 24 Canadian products percentage discounts, iron and steel being included in the latter category. Canada grants France intermediate tariff rates on 840 French products and grants Canadian tariff reductions of 10 to 25 per cent below the intermediate rates to 99 French products.

Among Canadian products granted minimum tariff rates are: Coal, aluminum, ferroalloys, copper, lead, zinc, nickel ore and oxides, cadmium cobalt ore and oxides, coal tar, electrical insulators, steam engines, pumps, compressors and unspecified motors, internal combustion engines, agricultural machinery and parts, sewing machines, electric dynamos and transformers, wireless telegraph and telephone apparatus, electrical heating apparatus, flour milling machinery, hoists, pulleys, typewriters, refrigerators, tools, automobiles, trucks and accessories.

The following receive discounts from French general tariff: Unspecified machinery, stoves, iron and steel chains, pipes and tubes. Among items on which Canada has granted intermediate rates are 278 products classified as "Metals and Manufactures."

Steel Corporation Transfers Properties

Subsidiaries of the United States Steel Corpn. have effected transfer of properties as follows: Indiana Steel Co. has been transferred to the Illinois Steel Co. and the Gary Tube Co. has been acquired by the National Tube Co. The Indiana steel properties were originally built and operated by the Illinois Steel Co. These transfers represent the largest real estate transaction in the history of Indiana.

Buyers Not Storing Steel, Says E. T. Weir

Ernest T. Weir, chairman of the National Steel Corpn., states "that orders for steel are coming in from a wide range of buyers."

"The expansion of sales," he said, "has not been due to any one type of consumer. Buyers are not storing steel—they are using it."

Coal Freight Rates to Youngstown Questioned

WASHINGTON, May 16.—The Interstate Commerce Commission has reopened the case regarding ex-river bituminous coal from Colona and Conway, Pa., to Youngstown, Ohio. Hearings will begin next Monday. The case was reopened upon petition of trunk line carriers. They contended that the rate of 97c. from Colona and Conway, Pa., to Youngstown, established as the result of a Commisson decision resulted in reductions on the Wheeling & Lake Erie railroad from Ohio river points to Canton, Massillon, Cleveland, Lorain and South Lorain, Ohio, which threaten to disrupt the coal rate structure in Central Freight Association territory. The Pennsylvania and the Pittsburgh & Lake Erie had proposed a rate of $1.02 on ex-river coal from Colona and Conway. The Commission held it to be unreasonable to the extent it exceeded 97c. Rates finally established on the Wheeling & Lake Erie from Martins Ferry, Mingo Junction and other Ohio river points were $1.02 to Canton and Massillon and $1.27 to Cleveland, Lorain and South Lorain.

Chicago Steel Treaters Elect Officers

A. W. Sikes, Western Electric Co., Chicago, has been elected chairman of the Chicago chapter of the American Society for Steel Treating. Other officers elected are: Vice-Chairman, M. A. Grossman, Illinois Steel Co.; secretary and treasurer, J. A. Comstock, Peoples Gas Co.; members of the executive committee, Walther Mathesius, Illinois Steel Co.; R. A. Bull, Electric Steel Founders Research Group; E. T. Jackman, Firth-Sterling Steel Co.; W. J. MacKenzie, Republic Steel Corpn.; C. H. Stevenson, Hevi Duty Electric Co.; J. E. Robinson, International Harvester Co.; H. A. Anderson, Western Electric Co.; Morris Chase, A. Finkl & Son; Kenneth H. Hobbie, Driver-Harris Co.; Jeftyn Williams, Mills Novelty Co.; J. H. Nead, Inland Steel Co.

Before the New Deal, Uncle Sam Must Discard

SOMETIMES it is necessary for a company to build a new plant and to revise, very completely, its manufacturing methods. For the time comes, in the steady evolution of industry, when it will no longer suffice to patch up the old structures or to put up with antiquated machinery. And no one, whatever his position in life or in industry, questions the wisdom of this progressive practice. The ways and means of 1890 will not do at all today.

It is strange that we have not given equal acceptance to this common sense principle as applied to legislation.

INDUSTRY, business and legislation are inextricably tied together in the movement of progress. But whereas industry and business keep fit by continually discarding the obsolete, legislation does not. It seldom repeals. It patches and adds to the century old structure of law until the edifice becomes so rambling and so ramified that the mind of man becomes lost in its mazes.

Thus the law of 1890, against acts "in restraint of trade," becomes today a law which itself acts in restraint of trade.

CONSIDER the radically changed conditions between 1890, when the Sherman Act became law, and the conditions of today. *Then,* demand exceeded supply. We had a "seller's" market. *Now,* supply exceeds demand and the buyer dictates price.

Then, there was little recognition of the importance of wages as the principal factor in consuming power. *Now,* every intelligent employer realizes that directly or indirectly the wage-earner forms the principal market for the vast majority of products.

Then, wages, dividends and public interest were at odds and "devil take the hindmost." Today, after the enlightenment of 30 years of experience, we find these factors closely alined in common objectives.

Then, the public may have needed protection against upward price manipulation. *Now,* the public realizes that its economic survival depends upon our protection against ruinously low prices, at home and from abroad.

WE are moving, now, through the "new deal" toward self control and stabilization of production, wages and prices. But we cannot reach that goal while the outmoded and decrepit legislative structure of 1890 and its patchwork additions still stand.

The Sherman and other "restraint of trade" acts have become obsolete in the light of changed conditions. Their outmoded structures have become merely a breeding ground to protect and propagate the price cutting vermin which gnaw away the foundations of wages and earnings and which the great majority of our people of all classes would be glad to see exterminated.

Nor can the suggested "liberalization" of interpretation of these laws suffice to meet the present-day need for decisive broad action by trade groups. For the in-

terpretation of law is constitutionally a judicial function, based upon specific cases and entailing delays and obscurities which would completely defeat the purpose of quick movement.

As has been aptly said: "No longer can Uncle Sam with one hand pat a group of manufacturers on the back in their efforts to stabilize industry, and chastise them with the other hand for so doing."

IT is time to scrap the obsolete and hampering legislation of 1890 and to replace it with a clear and understandable protective act in keeping with our new times and great purposes.

We commend to our readers and to our legislators, the following timely appeal for the relief of industry presented by the distinguished inventor and machinery builder, Henry A. Wise Wood:

May 15, 1933.

ON behalf of the metal-working industries, I urge that the Sherman and Clayton Acts be so modified as to eliminate those characteristics that the country's recent experience has proven to be destructive.

Drawn to prevent unreasonable restraint of trade and unethical commercial practices, these Acts are unfortunately serving to compel industry to dissipate its working capital in self-destructive competition.

If it has been an anti-social act for industry to conspire to maintain unreasonably high prices, it would seem now to be no less an anti-social act to permit industry to dissipate the working capital upon which its public depends for services, and its labor for employment.

It long has been the fashion to give to labor that measure of protection—the rights of consolidation and cooperation—which its necessities have required. It now becomes imperative that capital shall be accorded the same rights, in order that labor shall be secure in its employment.

If the public is to be well served, with ever more efficient and dependable products offered at low cost, Government must act to conserve the working capital of industry, upon which the public depends for goods and services.

It is therefore no less in the interest of the public and labor than of industry, that an end shall be put to the devastating effects of these Acts. They should be reconstructed in such fashion that they will conserve America's industrial capital and encourage the accumulation of earnings, to the end that there shall be assured the satisfaction of the need of the public for service, of labor for employment, and of industry for earnings.

HENRY A. WISE WOOD.

Wagner Bill Links Public Works With Industry Control

Suspension of Anti-Trust Laws and Sales Tax to Support Governmental Construction Program Proposed

WASHINGTON, May 16.—President Roosevelt is pressing for early action on the so-called public works-industrial control legislation. Satisfactory progress is reported toward ironing out differences as to the character of the impending bill to be introduced by Senator Wagner of New York this week.

One difficulty encountered relates to the plan of providing interest and amortization payments to retire the outlay on public works and other non-budgetary appropriations, the latter aggregating $1,900,000,000 being included in the farm relief bill and in the program to refinance farm mortgages, etc. A general sales tax, or "reemployment tax," said to be at the rate of 1¼ per cent, to be levied against industry, has been given serious consideration. The tax which is planned is to raise $220,000,000 annually for this purpose. It is understood that the President will leave the method of taxation to Congress for settlement. The means of raising the public works fund also is uncertain as yet. One suggestion calls for turning to the inflationary powers given the President in the newly-enacted farm relief law through a bond issue.

Manufacturers' Association Collaborates

Industry, however, is especially interested in industrial control feature of the bill. For this reason the National Association of Manufacturers, with the approval of President Roosevelt, has set up a committee, selected by President Robert L. Lund of the association. This committee has held conferences with President Roosevelt and drafters of the bill, including Senator Wagner, Secretary of Commerce Roper, Director of the Budget Douglas and members of the House and Senate. Mr. Lund heads the committee of industrialists. Among other members are Charles R. Hook, president, American Rolling Mill Co., Middletown, Ohio; Lammot du Pont, president, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; E. R. Harriman, president, United States Chamber of Commerce, Washington; James H. Rand, Jr., president, Remington-Rand, Inc., New York; Homer L. Ferguson, president, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.; O. Max Gardner, former governor of North Carolina, and James A. Emery, general counsel of the association.

Economically revolutionary, the legislation is being pushed as a means of restoring employment and purchasing power, and reviving industrial activity on a widespread scale. The industrial-control section of the measure would permit self-regulation of industry to a degree never previously approached, through suspension of the anti-trust acts and permission for trade association agreements. There would be Government supervision, however, and while sections of industry are concerned over the Government control feature—President Roosevelt calls it Government partnership—it is plain that industry has accepted the plan with rather wide acclaim, almost with enthusiasm, such as would have been non-existent a few years back.

On the public works feature of the bill there has been a division of opinion among conferees. It is said that there has been one view that the actual outlay for public works should not exceed $750,000,000, leaving the remainder for industrial initiative through private credit. The idea is that self-liquidating projects especially ought to be pushed to the fore and non-productive projects kept to the minimum.

Anti-Trust Laws to Be Suspended

The industrial control section would partake largely of suggestions coming from industrialists, some of them having been set forth at the recent meeting of the Chamber of Commerce of the United States. To this end, the anti-trust laws would be suspended. Trade association agreements and trade practice codes would be permitted to operate. Organized labor has insisted upon the right of collective bargaining. It is understood general reference is made of this feature to the extent that, where it is required, approval of trade agreements or trade practice codes will not be given unless recognition of collective bargaining is granted. Trade agreements and practices, covering production, hours of work, wages, and, it is also said, prices, are or may be included, to be submitted to the agency or agencies set up by the President. Unless disapproved, they would go into effect within 30 days after being laid before the Government. The Wagner measure has definitely shelved the Black-Perkins 30 hr. bill.

Public works projects are not specified, it is reported, but provision is made for allocation of a certain portion of the funds for public roads. The public works section would be operated under a public works administrator.

Private industry, when meeting the terms of trade agreements designed to eliminate unfair practices, would be permitted to borrow from the R.F.C., but assurance of reemployment would have to be given and the projects would have to be shown to be sound so as to guarantee repayment to the Government.

It is probable the hearings will be of comparatively short duration in order that the bill may be expedited. It is said also that the bill as now drafted carries a limited license feature, leaving to the President the requirement of a license in certain cases for particular industries. This proposal also has met with considerable opposition. Inasmuch as the bill has a revenue-raising feature, it apparently will go to the House Committee on Ways and Means first.

As drafted, the bill is limited to two years, unless cut to a shorter period by proclamation of the President.

W. R. Lysaght Heads British Steel Institute

The Iron and Steel Institute held its sixty-fourth annual meeting in London, England, May 4 and 5. It elected William Royse Lysaght, of John Lysaght, Ltd., its president for the ensuing year and presented the Bessemer gold medal for 1933 to Dr. W. H. Hatfield, head of the Firth-Brown Research Laboratories, Sheffield. Numerous metallurgical and engineering papers, mention of many of which has already been made in these columns, featured the meeting, but reviews of them will be given in subsequent issues. Secretary George C. Lloyd, in his annual report, disclosed a total membership of 1894; elections to membership numbered 58, resignations during the year totaled 101 and members were dropped for the non-payment of dues to the number of 43.

Mr. Lysaght has been identified with the industry for nearly 60 years, having joined the Gospel Oak Iron Co., Tipton, Staffordshire, maker of galvanized iron, in 1874. It was in 1878 that he entered the Lysaght organization, when John Lysaght made him assistant manager of the then acquired Thorneycroft's Swan Garden Works, in Wolverhampton.

In his presidential address, Mr. Lysaght traced the changes in the sheet steel industry, both in respect to equipment and working conditions, pointed out how many nations formerly customers of the British industry were becoming self-sufficient but expressed the belief that the future held promise in the use of sheets for an increasing number of purposes. In the course of his remarks about the problems of manufacture, he touched on the baffling experiences in the matter of roll breakages. His conviction is that the great bulk of the breakages is caused by the treatment received in the mill. "Erratic preheating, abnormal variations in rolling temperature, overscrewing, bad turning and other avoidable maltreatment," he said, "cannot be inflicted upon a delicate and highly strung body like a chilled cast-iron roll without disastrous results."

Deferred Railroad Maintenance Close to $2,000,000,000

WASHINGTON, May 16.—Deferred railroad maintenance from 1927 through 1932 was estimated at $1,720,000,000 by Joseph B. Eastman, a member of the Interstate Commerce Commission, in the course of testimony he presented last week before the House Committee on Interstate and Foreign Commerce and the Senate Committee on Interstate Commerce. Commissioner Eastman was testifying in connection with the administration's pending railroad coordination bill. His name has been mentioned prominently as the choice of President Roosevelt to be Federal transportation coordinator if the measure is enacted.

The estimated deferred railroad expenditures do not provide for reductions due to less property maintained or less use of property. They do, however, allow for price decreases since 1927, the basic year.

Submitting elaborate exhibits, Commissioner Eastman divided the deferred expenditures from 1927 through 1932 as follows: Maintenance of way and structures, $708,000,000; maintenance of steam locomotives, $581,000,000; maintenance of freight cars, $431,000,000. The 1927 expenditures were: Maintenance of way and structures, $530,432,000; maintenance of steam locomotives, $435,565,000; maintenance of freight cars, $340,696,000.

A "breakdown" of these classifications of expenditures annually, for the period 1927-1932, disclosed the striking decline spent in the latter year for various kinds of requirements.

The following shows the comparison of expenditures in 1927 and 1932:

Rails:	
1927	$49,764,000
1932	8,546,000
Other track material:	
1927	$50,553,000
1932	10,711,000
Bridges, trestles and culverts:	
1927	$41,596,000
1932	12,058,000
Ties:	
1927	$116,917,000
1932	34,822,000

While Commissioner Eastman made no mention of plans for purchases to meet deferred requirements, it is known that proposals have been made to President Roosevelt. The principal one would call for loans by the Reconstruction Finance Corpn. It is the question in some quarters, however, as to whether the railroads would be willing to ask for the loans.

Pointing out that the legislation is proposed to meet present emergency needs and that it would cease to have effect one year after its effective date, unless extended for one year or part of a year by proclamation of the President, Commissioner Eastman said that clearly the Government must move in the direction of the elimination of unemployment.

He said that he hoped to see an attack of this character made "along a wide front and apparently one is about to begin."

Elimination of Grade Crossings

In this connection he stated that a public works program might well include widespread elimination of railroad crossings at public expense. It was not so indicated by Mr. Eastman, but it is understood that the Wagner public works bill would embrace this as part of the program. No estimate has been made as to the expenditures that might be made in this direction, nor is it believed to be contemplated to enter upon the job of eliminating all railroad crossings, which would involve billions of dollars. But it is understood that railroad crossing elimination on a wide scale would be undertaken.

Speaking of economies that could be effected through a system of railroad coordination, Commissioner Eastman suggested along with many other things, the elimination of wasteful practices in the purchase of equipment, rails, ties, materials and supplies, including not only purchasing methods but also standardization and specifications. Mr. Eastman did not develop the suggestion but it is known that study is being given to standardization of and specifications for equipment followed by other industries. Much in this direction has been done by other industries through cooperation with the Bureau of Standards, and it is assumed it would develop work of this kind more extensively in the railroad field than now is being done.

Commissioner Eastman said that he considers as perhaps the most important portion of the bill the section providing for the immediate study of improving conditions surrounding transportation in all its forms and preparation of plans to this end.

Railroads Must Change Operating Methods

He said that to bring about such a result the railroads must not only operate with maximum efficiency and economy but must also change their methods of operation and service and their types of equipment in important respects and utilize motor vehicles and perhaps water and air carriers as auxiliaries to a much greater extent than at present. In this connection proposals are being studied, though they were not mentioned by Mr. Eastman in his testimony, for the railroads to expand store door delivery by motor trucks, improved use of terminal service, new types of cars and containers, the use of detachable truck bodies, etc. New alloy steels already are being used to a great extent both in order to improve quality and life and also to lighten and strengthen cars.

The suggestion made by Mr. Eastman for elimination of grade crossings has been strongly supported by railroad executives. General W. W. Atterbury, president of the Pennsylvania, has pointed out that an army of men could, with profit to the nation, be put to work in this direction. Many furloughed railroad men, he has explained, could be fitted in. The greatest necessity for grade crossing elimination, according to General Atterbury, exists in the very places where unemployment is most severe.

This is also work of a character in which the greater part of the expenditures go to labor. The direct expenditures for grade crossing eliminations average 60 per cent labor and 40 per cent material, and the latter, in the last analysis, means more labor.

To Discuss Roll Neck and Gear Lubrication

Papers on lubrication of roll necks, gears and wire rope are included on the program of the lubrication engineering meeting to be held at the Pennsylvania State College, State College, Pa., May 25-26, under the joint auspices of the college and the lubrication engineering committee of the petroleum division of the American Society of Mechanical Engineers.

"Practical Interpretation of Lubricant Specifications" will be discussed by J. G. O'Neill, United States Engineering Experiment Station, at the opening session. The paper on roll neck lubrication, by W. D. Hodson, Hodson Corpn., Chicago, is scheduled for the afternoon session, which also includes a paper on "Machine Design for Lubrication," by E. M. Barber and C. C. Davenport, Pennsylvania State College. In the evening, Dr. A. E. Becker, Standard Oil Development Co., New York, will discuss "Lubricant Viscosity Standardization for Industrial Equipment."

At the gear session, on May 26, Dr. O. C. Bridgman, Bureau of Standards, Washington, will speak on "Applications of Extreme Pressure Lubricants to Industrial Machinery," and Austin Kuhns, Farrel-Birmingham Co., Buffalo, will discuss "Problems of Lubricating Heavy-Duty Gears." The afternoon session will include a paper on "Wire Rope Lubrication" by A. J. Morgan, John A. Roebling's Sons & Co., Trenton, N. J.

National Association of Ornamental Iron, Bronze and Wire Manufacturers is moving its headquarters from 1331 G Street, N. W., Washington, to 1772 Kessler Boulevard, South Bend. Ind.

SUMMARY OF THE WEEK'S BUSINESS

Steel Demand Loses Momentum As Output Reaches New High

Business Gaining at Slower Rate But Ingot Average Rises to 35 Per Cent—Advances in Pig Iron and Mixed Trend in Scrap

THE upward swing of iron and steel demand has lost some of its force. While buying continues to gain, the increase is at a slower rate than heretofore. Tin plate is conspicuous because of a further sizable increase in output, which now averages 65 per cent of capacity, but steel specifications from the automobile industry, which have been the major factor in the recent rebound in iron and steel requirements, have ceased to expand materially. Orders from miscellaneous sources continue to show encouraging growth, with better business emanating from plate fabricators and fair initial releases coming from the heretofore inactive farm equipment industry, yet it is doubtful whether further important gains in steel output can be made without the support of the railroads and the building industry.

Fabricated structural steel awards, at 3750 tons, are the smallest for any week this year and compare with 4700 tons in the previous week. Structural shops in the Chicago district are operating at less than 10 per cent of capacity.

Hopes for construction tonnage are centered in the inauguration of a vigorous public works program. It is now the President's move, in the opinion of the steel trade, and there is genuine confidence that he will make that move with characteristic promptness and energy. The belief that action on public projects would be without immediate effect on the steel industry is not well founded, since bids are in on a considerable number of jobs and the signing of contracts is the only official step yet to be taken.

Railroad shops in the Middle West are commencing to take steel in a small way, but purchases by the carriers are still at a low ebb. An impending rail purchase by the New York Central will total only 7000 tons. While a proposed survey of railroad rolling stock is expected to disclose that a large proportion of existing equipment is not worth repairing, there are as yet no signs that the carriers will undertake extensive purchases of either cars or locomotives.

INDICATIONS of a loss of momentum in iron and steel demand are already reflected in scrap, always a sensitive commodity. The advancing tendency of scrap prices has not been universally checked, but signs of weakness have appeared at Cleveland and at Pittsburgh. A decline in heavy melting grade at Pittsburgh has offset an advance at Philadelphia, leaving THE IRON AGE composite price for steel melting scrap unchanged at $9.83 a gross ton.

Prices in other primary materials continue to move upward. Pig iron prices have been marked up 50c. a ton at Chicago, 50c. to $1 a ton at Cleveland and Lake furnaces, and $1 a ton at Pittsburgh and Youngstown. THE IRON AGE composite price for pig iron has risen from $14.33 a week ago to $14.41 a gross ton, its highest level since March, 1932. Jackson County producers have advanced silvery iron $2 a ton and Bessemer ferrosilicon $1.50 a ton.

Among finished products, reinforcing bars have been marked up $4 a ton by various distributers. Further advances by the mills on various products are in early prospect. New prices on wire and nails may be announced shortly, and third quarter quotations on sheets and strip will soon be named.

THE course of the steel production curve is still ascendant. Increases are reported in the Valleys and the Wheeling district, as well as at Pittsburgh, Chicago, Cleveland, Birmingham and in eastern Pennsylvania. The national average of ingot output now stands at 35 per cent, compared with 31 per cent a week ago.

It seems doubtful whether the automobile industry, which has contributed so heavily to production increases to date, can be counted on to lift output to still higher levels. Nevertheless motor car makers now are confident of maintaining a good rate of operations for some time to come. Their faith in the permanence of recent improvement in business is reflected in preparations for capital improvements. Orders for $70,000 worth of machine tools, just placed by the Chrysler Corpn., constitute the first sizable purchase of such equipment since Ford retooled for the V-eight car.

GREAT BRITAIN'S bilateral trade agreements are opening up prospects for increased business in iron and steel. British pig iron producers look for heavier orders from Denmark as a result of such a compact, and are reported to be quoting prices below cost. The Continental Steel Cartel has established selling agencies as follows: steel bars at Luxemburg, beams at Paris, semi-finished steel at Liege, plates and sheets at Düsseldorf.

THE IRON AGE composite price for finished steel is unchanged at 1.867c. a lb.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:	May 16, 1933	May 9, 1933	April 18, 1933	May 17, 1932
No. 2 fdy., Philadelphia	$15.34	$15.34	$14.34	$14.84
No. 2, Valley furnace	14.50	14.50	14.50	14.50
No. 2 Southern, Cin'ti	15.82	15.82	13.82	13.82
No. 2, Birmingham	12.00	12.00	11.00	11.00
No. 2 foundry, Chicago*	**16.00**	15.50	15.50	16.00
Basic, del'd eastern Pa.	15.09	15.09	14.09	16.00
Basic, Valley furnace	14.00	14.00	13.50	14.00
Valley Bessemer, del'd P'gh.	16.89	16.89	16.89	16.89
Malleable, Chicago*	**16.00**	15.50	15.50	16.00
Malleable, Valley	14.50	14.50	14.50	15.00
L. S. charcoal, Chicago	23.17	23.17	23.17	23.17
Ferromanganese, seab'd carlots	68.00	68.00	68.00	75.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$40.00	$40.00	$40.00	$43.00
Light rails at mill	30.00	30.00	30.00	34.00
Rerolling billets, Pittsburgh	26.00	26.00	26.00	27.00
Sheet bars, Pittsburgh	26.00	26.00	26.00	26.00
Slabs, Pittsburgh	26.00	26.00	26.00	27.00
Forging billets, Pittsburgh	31.00	31.00	31.00	33.00
Wire rods, Pittsburgh	35.00	35.00	35.00	37.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.60	1.60	1.60	1.60

Finished Steel

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.60	1.60	1.60	1.60
Bars, Chicago	1.70	1.70	1.70	1.70
Bars, Cleveland	1.65	1.65	1.65	1.65
Bars, New York	1.95	1.95	1.95	1.95
Tank plates, Pittsburgh	1.50	1.50	1.50	1.60
Tank plates, Chicago	1.70	1.70	1.70	1.70
Tank plates, New York	1.598	1.598	1.598	1.898
Structural shapes, Pittsburgh	1.60	1.60	1.60	1.60
Structural shapes, Chicago	1.70	1.70	1.70	1.70
Structural shapes, New York	1.86775	1.86775	1.86775	1.86775
Cold-finished bars, Pittsburgh	1.70	1.70	1.70	1.70
Hot-rolled strips, Pittsburgh	1.45	1.45	1.45	1.40
Cold-rolled strips, Pittsburgh	1.80	1.80	1.80	2.00

Finished Steel

Per Lb. to Large Buyers:	May 16, 1933 Cents	May 9, 1933 Cents	April 18, 1933 Cents	May 17, 1932 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.00	2.00	2.00	2.20
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.10	2.10	2.10	2.30
Sheets, galv., No. 24, P'gh	2.70	2.70	2.60	2.85
Sheets, galv., No. 24, Chicago dist. mill	2.80	2.80	2.70	2.95
Hot-rolled sheets, No. 10, P'gh	1.40	1.40	1.40	1.55
Hot-rolled sheets, No. 10, Chicago dist. mill	1.50	1.50	1.50	1.65
Wire nails, Pittsburgh	1.85	1.85	1.85	1.95
Wire nails, Chicago dist. mill	1.90	1.90	1.90	2.00
Plain wire, Pittsburgh	2.10	2.10	2.10	2.20
Plain wire, Chicago dist. mill	2.15	2.15	2.15	2.25
Barbed wire, galv., P'gh	2.35	2.35	2.35	2.60
Barbed wire, galv., Chicago dist. mill	2.40	2.40	2.40	2.65
Tin plate, 100 lb. box, P'gh	$4.25	$4.25	$4.25	$4.75

Old Material

Per Gross Ton:				
Heavy melting steel, P'gh	*$11.75*	$12.25	$10.25	$9.50
Heavy melting steel, Phila.	**9.25**	8.75	7.00	6.50
Heavy melting steel, Ch'go	8.50	8.50	5.75	6.25
Carwheels, Chicago	**9.50**	8.50	8.00	6.50
Carwheels, Philadelphia	9.75	9.75	8.50	9.00
No. 1 cast, Pittsburgh	10.50	10.50	9.25	9.25
No. 1 cast, Philadelphia	10.25	10.25	8.00	8.00
No. 1 cast, Ch'go (net ton)	**8.75**	8.00	6.75	6.50
No. 1 RR. wrot., Phila.	10.75	10.75	7.50	8.50
No. 1 RR. wrot., Ch'go (net)	**6.50**	6.00	4.50	4.25

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$1.75	$1.75	$1.75	$2.25
Foundry coke, prompt	2.50	2.50	2.50	3.00

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery	**6.75**	6.50	5.12½	5.12½
Lake copper, New York	**7.00**	6.75	5.37½	5.75
Tin (Straits), New York	*35.87½*	36.00	26.12½	20.37½
Zinc, East St. Louis	*3.70*	3.75	3.15	2.30
Zinc, New York	*4.07*	4.12	3.52	2.67
Lead, St. Louis	3.52½	3.52½	3.12½	2.90
Lead, New York	3.65	3.65	3.25	3.00
Antimony (Asiatic) N. Y.	6.25	6.25	5.60	5.30

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
May 16, 1933	1.867c. a Lb.	$14.41 a Gross Ton	$9.83 a Gross Ton
One week ago	1.867c.	14.33	9.83
One month ago	1.867c.	13.68	7.67
One year ago	1.970c.	14.06	7.41
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot rolled strip. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1933	1.948c., Jan. 3	1.867c., Apr. 18	$14.41, May 16	$13.56, Jan. 3	$9.83, May 9	$6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.42, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Pittsburgh Market Loses Some of Its Buoyancy

Steel Ingot Output Rises to 23 Per Cent and Pig Iron Prices Are Advanced, But Scrap Shows Weakness

PITTSBURGH, May 16.—Recent improvement in releases of finished steel products in this district has been checked to some extent in the last week, but steel production continues to expand. Contraction in demand is not definitely noticeable on any important products, but the rate of increase is not so marked. Exceptions may be made in the case of tin plate, and in the movement of steel plate for fabricating purposes. The latter has responded to increased orders from the brewing industry, as well as slightly increased takings by railroad shops for car repair purposes. Structural steel demand continues to lag, although shipments of merchant bars are still expanding and inquiry for both reinforcing bars and structural steel is coming out in better volume. The prospect of large orders for steel barges by oil companies in the near future has given this division of the industry a better outlook.

Shipments to the automotive industry have not begun to diminish, but no further expansion is noticed. Railroad buying is featured by a release of 20,000 to 25,000 tons of rails from the Pennsylvania. A part of these will come to the Pittsburgh mill, which may be able to resume production next week.

Steel ingot output in the Pittsburgh district has again risen, and is now estimated at 23 per cent of capacity. No curtailment is reported at any of the principal plants, and gains have been rather evenly distributed. Blast furnace output is unchanged, although plans are being made to blow in one or two units if business continues to expand. Youngstown district steel-making schedules are also higher, with a 40 per cent rate indicated for the week. Wheeling district production is now estimated at at least 75 per cent, with one large open-hearth plant fully engaged.

Finishing mill schedules are slightly higher on tin plate and sheets. Tin plate production is approaching 65 per cent, while sheet output is estimated at 35 per cent.

Price trends during the week have been mixed, an advance of $1 a ton in the principal grades of pig iron at Pittsburgh and in the Valleys having been offset by a 50c. decline in scrap. Finished steel quotations are without feature, although a $4 a ton increase in distributers' prices on reinforcing bars is in prospect. Plates and cold-rolled strip are the only products which might be considered weak.

Pig Iron

Pig iron prices in the Pittsburgh and Valley districts have been advanced $1 a ton, effective immediately. This brings the asking prices at Valley furnaces to $15 on basic iron, $15.50 on foundry and malleable, and $16 on Bessemer. The Pittsburgh district furnace is quoting 50c. a ton higher. A few quotations at lower figures are still out, but will be withdrawn this week if purchases are not made. The A. M. Byers Co., Ambridge, Pa., and the Edgewater Steel Co., Oakmont, Pa., are expected to close on tonnages of Bessemer and basic iron, respectively, this week. A number of small orders have been taken in the last week, and shipments are running well ahead of May. The Shenango furnace at Sharpsville, Pa., went into blast on May 14.

Semi-Finished Steel

Shipments in the first half of the month were well ahead of the April average, but little new buying is reported. The price of $26, Pittsburgh or Youngstown, on billets, slabs and sheet bars is well maintained, while forging billets are strong at $31. Wire rods are holding at $35, Pittsburgh or Cleveland, but demand is rather light.

Rails and Track Accessories

The Pennsylvania Railroad has released a quantity of rails variously estimated at 20,000 to 25,000 tons. These will be rolled in four mills, although the Pittsburgh district maker will receive a fairly large share. Report of an order by the New York Central cannot be confirmed, although it is admitted that at least 7000 tons has been authorized for purchase between now and the middle of the year. Demand for track accessories is slightly heavier than it was last month, but activity on the part of the carriers is still slack.

Bolts, Nuts and Rivets

Demand is improving gradually, although the automotive is the only large bolt and nut consuming industry which has developed much activity. Discounts are well maintained, and a price advance will likely be undertaken for the third quarter.

Bars, Plates and Shapes

Specifications for structural steel and reinforcing bars continue light, but there is more activity in the plate market. Movement of bars is fairly satisfactory. Inquiry for fabricated structural steel is accumulating at a fair rate, and is beginning to benefit from projects deriving financial aid from the Reconstruction Finance Corporation. Highway construction in Pennsylvania and nearby states is still being held back, although bids will be taken May 26 for two or three jobs in Pennnsylvania. A part of the recent improvement in plate tonnage is coming from the brewing industry, and orders for steel barges may bring additional outlets in the next month or two. A large number of river craft, particularly for oil carrying purposes, are being considered, but no actual inquiry has developed.

Alloy steel bars are moving to the automotive industry in good volume, and miscellaneous demand for merchant bars continues to expand. Bar mills in the district are engaged at at least 25 per cent of capacity. Nothing definite regarding an advance in bar, plate and shape prices is reported in this district. Plates are somewhat stronger, although Pittsburgh mills are still forced to meet 1.50c., Pittsburgh, as quoted by Eastern producers. Reinforcing bar distributers are soon expected to announce an advance of $4 a ton, bringing their price on mill lengths up to the same level as merchant bars.

Tubular Goods

Standard pipe continues to move in comparatively good volume, although demand for other tube mill products is very light. Oil country goods are moving out of down-river warehouses in slightly better volume, but the improvement has not yet been reflected in shipments from Pittsburgh mills. Line pipe is very dull, and companies which are considering projects are hesitant in closing them.

Wire Products

Producers report a limited expansion in demand, particularly on merchant products going to large jobbers in the South and Southwest. The smaller distributers are hampered in moving up their stocks by their inability to secure banking aid in many centers. Manufacturers' wire is going to the automotive industry at about the same rate as it has been, but demand from other sources has failed to show any marked gain. Wire mesh is still very quiet. An advance in prices on wire and nails may be made this week.

Sheets

Orders are holding up fairly well, but no further improvement has been reported in the last week. Nevertheless, demand continues to grow more diversified, with many buyers who have been out of the market for many months again taking steel. Steel furniture producers are an example of this tendency. Barrel and drum makers continue fairly busy, and shipments to refrigerator manufacturers are still holding up. Specifications from the automotive industry are heavy, and mills in the Detroit district are particularly busy. Output in the industry as a whole this week will average about 35 per cent of capacity.

Prices are well maintained, but the

higher asking quotations announced late in April have had very little test. Practically all buyers of importance were covered at the lower figures, and only occasional carload lots are being sold at the new prices. Nevertheless, business can hardly be placed today at less than 2.10c., Pittsburgh, on black sheets, 2.70c. on galvanized, and 2.45c. on light cold-rolled. A further advance to apply to third-quarter tonnage may be made in the next month, and this would unquestionably establish the current figures.

Tin Plate

Specifications continue to improve, and production has expanded correspondingly. Mill schedules last week rose to 60 per cent, and the industry as a whole will run at 60 to 65 per cent this week. Several plants are fully engaged, and none is running at less than 50 per cent. No definite announcement concerning second-half prices has been made, and at the moment there is little likelihood of a change.

Strip Steel

Makers of hot and cold-rolled strip report little further expansion in releases, but specifications are coming in steadily, and tonnage is fairly well diversified. Hot strip mills are engaged at about 35 per cent of capacity, although cold-rolling units are not running so well. Prices of less than 1.55c., Pittsburgh, on hot-rolled strip have now been withdrawn, but consumers were generally covered at the 1.45c. level, and the new figure is receiving little test.

Coal and Coke

The coke market is a little more active, particularly the foundry grades. Furnace coke is still rather dull. Coal mines in the district are running at a better rate, particularly those supplying steel mills. Large buyers of coal are showing an interest in covering their requirements for the remainder of the year, but producers are not anxious to take contracts unless they can begin shipments immediately.

Scrap

The scrap market has eased off in the last week because of lack of mill buying, coupled with reduced purchases by dealers against old orders. No. 1 heavy melting steel is now available to dealers at $11.50 and even less, while mills have revised downward their buying prices. The other principal steel-making grades are correspondingly weaker. Sale by the Baltimore & Ohio Railroad of at least 200,000 tons of railroad car and locomotive scrap to a large district consumer is reported. The transaction is apparently being handled by a broker, and details are not available. Prices for the uncut scrap are said to have ranged from $8.50 to $9.50 a ton. If the deal removes the buyer from the market for any length of time, the effect might be considered depressing to the scrap trade, but on the other hand removal of large tonnages held by the railroads might be interpreted as favorable to a long range upward trend in prices. Scrap buying by foundries is slightly heavier, and these grades have not reflected the weakness noticed in the steel-making commodities. Scrap prices in the Valley district do not appear to have reflected the weaker tone in evidence at Pittsburgh.

Warehouse Prices Up on Coast

SAN FRANCISCO, May 15.—In line with advances in mill prices on sheets warehouses have announced new prices of 3.10c. on No. 10 hot-rolled annealed, 3.80c. on No. 24 hot-rolled annealed, and 4.40c. on No. 24 galvanized. Warehouse prices on reinforcing bars, at 3c., are exceptionally weak. All c.i.f. prices are firm with the exception of tank plates at 2c. A decided increase of activity is to be noted at Los Angeles, while mills at San Francisco have increased their production materially. Indications point to a general rise in prices in the near future.

The week was marked by the appearance of a number of small jobs but an absence of projects requiring major steel tonnages, although a number of the latter are pending. Steel subcontracts totaling 4180 tons of reinforcing bars and 1934 tons of structural steel should be awarded shortly for the county jail and Bohemian club at San Francisco and for the torpedo room and piers and quay walls at Pearl Harbor, T. H. As soon as general contracts are signed on the San Francisco-Oakland bridge considerable tonnage will be let to local mills. At Seattle bids on the Diablo power house, requiring 660 tons of structural steel, have been advanced to May 24.

Active Buying of Pig Iron at Buffalo

BUFFALO, May 16.—Comparatively heavy buying of pig iron has taken place during the past week. While the melt continues low, shipments are better and foundries are apparently anxious to cover in the face of what appears to be a rising market. Buffalo furnaces are getting full differentials on Eastern business and the $14 base appears to have disappeared. Silvery prices appear to be strengthening. Several 500 to 1000-ton lots have been placed during the past week, as well as a number of 200 to 500-ton lots.

Steel

Operations of steel plants are being maintained, with the Lackawanna plant of Bethlehem operating nine open-hearths, Republic four open-hearths, Wickwire-Spencer, one. The Seneca sheet division of Bethlehem is running at about 30 per cent of capacity. There is little activity in fabricated structural steel or reinforcing bars.

Scrap

A purchase by the largest local consumer of around 2500 tons of No. 1 heavy melting steel and No. 2 heavy melting steel, No. 1 busheling, new hydraulic compressed sheets, etc., was made during the week at $10 for the No. 1 steel and $8.50 for the other grades. The market is strengthening rapidly and, with scrap stocks in dealers' yards very low, they are not anxious to sell. There have been scattered sales of short rails at $12, low phosphorus at $12.50, railroad malleable at $10.50 to $11.00, and No. 1 cast at $10.00 to $10.50.

Steel Output Higher in South

BIRMINGHAM, May 16.—The pig iron situation is more favorable, even though demand is still just moderate and far from active. May shipments, to date, are better than for the same period in April. All three merchant producers report improvement. Inquiries have increased, indicating a better feeling on the part of the foundries. There is a more hopeful attitude among the foundries, with an expectancy of improved conditions. Current sales are light on account of previous bookings. Many foundries are fully covered for this quarter. Sales are being made regularly at the $12 base and the price is firm.

Pipe plant operations are slightly in advance of April, but current tonnage is still mostly in small lots. Owenton, Ky., opened bids last week on 350 tons and Marion, Ky., opened bids on May 15 on about 200 tons.

No change has taken place in blast furnace operations since the first of the month, three furnaces operating. One is on basic iron and two are on foundry iron. There is prospect of a fourth furnace going in around the first of June.

Steel

New tonnage is holding a fairly steady course, with slight weekly variations. Last week's bookings stepped upward and this week brings an increase in open-hearth operations. The demand is largely for light products. Structural tonnage has been small for some time. Railroad business is also light. Both steel manufacturers in this district have increased open-hearth production this week. Last week seven and eight open-hearth units were worked, and this week's schedules call for nine. Not since April, 1932, have this many been worked.

Jones & Laughlin Steel Corpn. reports a net loss of $2,060,645 in the first quarter, including all charges for taxes, interest, depreciation, depletion, etc.

Chicago Ingot Rate Rises to 33 Per Cent of Capacity

Steel Demand Still Growing—Pig Iron Prices Advance 50c a Ton—Scrap Moves to Higher Levels

CHICAGO, May 16.—Steel ingot production continues its upward climb and has now reached 33 per cent of capacity in this district. Both new sales and inquiries are within a few tons of establishing a record for any week so far this year. Automobile manufacturers are increasing their schedules and farm implement builders are slowly swinging into heavier production. Railroad shops are now coming into the market for some steel and an impending survey of idle railroad equipment is expected to result in larger orders for rolling stock. In addition to early preparations for oil storage tank programs several new oil refineries have been projected. The one remaining industry which fails to show some added life is building. Fabricating shops in the Chicago area are operating at less than 10 per cent of capacity.

Pig iron is up 50c. a ton and silicon differentials are stiffening, with the possibility that they may soon move back to 50c. a ton. Silvery is being advanced, and many grades of scrap are at higher levels, based on recent sales to consumers. Producers of plates, shapes, bars and wire products expect to announce third quarter price policies some time within the next ten days.

Pig Iron

Northern foundry and malleable iron are up 50c. a ton and silicon differentials, at 25c., are strong. It is probable that differentials may soon go to 50c. Sales in the first half of May were the heaviest in three years, and shipments in the first 12 days of this month were slightly larger than for the entire month of April.

Fluorspar

This market is more active, especially in territory surrounding Chicago. Prices for washed gravel, Kentucky and Illinois mines, range from $10.50 to $11.50.

Silvery

Recent sales have brought fair tonnages to sellers' books. Producers are advancing prices and all inquiries are subject to confirmation.

Coke

This commodity, for foundry use, is steady at $7 a ton, local ovens. Shipments are keeping pace with the pig iron movement, thereby giving clear indication that the foundry melt is steadily expanding.

Cast Iron Pipe

A few carloads moving to contractors sum up the week's transactions. Michigan City, Ind., has obtained Government aid and has selected engineers to make needed layouts and designs. Part of the plan covers replacing old wood stove pipe with cast iron pipe.

Reinforcing Bars

Illinois' dispute concerning prices charged by cement manufacturers is taking a new turn and the State is now threatening to lay asphalt in place of reinforced concrete roads. Indiana has placed some road tonnage and is awaiting Government aid before ordering 500 tons of bars. Some estimators believe the Chicago Carton Co.'s job will run as high as 1200 tons. On the whole, the market is very quiet.

Plates

From all indications oil producers are preparing to give some support to the steel market. In recent weeks tank projects have been taking shape and now it appears likely that several new refineries may soon be built. Railroad shops are busier and their steel needs are finally being felt at mills. The tonnages moving are not yet large but they are an example of the way in which demand is broadening. Reports are going the rounds that an extensive survey is to be made of railroad equipment that is listed as available but about which there may be some question. It has been contended by many that much of the idle equipment could not be made usable except at unwarranted expense. The results of this survey are eagerly awaited, inasmuch as it will give an idea of the potential demand for steel in that direction.

Rails and Track Supplies

Few small releases have been made against old contracts and several Western railroads have placed light tonnages of rails. All releases are for immediate delivery, and so both local mills are continuing to produce at a steady but curtailed rate. Demand for light rails is spotty and irregular. The rate of shipments is very low and has varied little from week to week since about the first of the year. Releases for track accessories are larger after having diminished in the early part of the month.

Wire Products

A moderate pickup in farm equipment manufacturing is now being felt in the wire market. Furniture manufacturers are also taking larger quantities, while miscellaneous industries are spotty but on the whole are gradually consuming more material. Buying by utilities is somewhat heavier, but this industry is moving with caution, presumably because of agitation for reductions of electric and gas rates.

Farm areas are still actively in the market, but the season is near an end because of the work required in the fields. Farmers usually begin to buy again in August. Prices for wire products can still stand more stability in some directions. Producers expect that third quarter prices will be announced in about ten days.

Structural Material

Shop operations in this district are not above 10 per cent of capacity. However, there is a note of encouragement in that several industrial projects are out for bids and a few small private jobs are being figured on. The World's Fair, which has been feeding numerous small jobs to local shops, has completed its purchases of steel.

Bars

The past week has been one of the best of the year, largely as the result of releases from automobile and parts manufacturers, as well as miscellaneous users. Railroad shops and farm equipment builders are using more bars. On the other hand, reinforcing bars are moving in very small volume.

Sheets

Output is well sustained at 50 per cent of capacity and it may go higher under the leadership of conductor pipe and roofing makers who have started the season late but are now beginning to manufacture for stock. There is no decline in consumption among container manufacturers or the automobile industry. Prices are firm and sellers are attempting to resist forward commitments at present levels.

Scrap

Prices remain strong and most brokers are looking for further advances. The Illinois Central has sold heavy melting steel at the equivalent of $9.30 a gross ton, delivered Chicago, but much of this tonnage will not come to Chicago. More industrial scrap is moving into the market and it is going at new high prices. Railroad offerings are light and scrap continues to move from here by boat.

Scrap Advance Halted at Detroit

DETROIT, May 16.—With considerable quantities of scrap coming into the market and with steel mills in possession of somewhat larger stocks than a few weeks ago, the upward movement of scrap prices has halted. However, all grades are firm and seem likely to continue relatively steady in the immediate future. The Chrysler Corpn. has sold to a local dealer well over 20,000 tons of material which it had accumulated during recent months. Blast furnace scrap destined for a northern Ohio steel company has been moving from Detroit to Cleveland by water.

Steel Production Rises in Eastern Pennsylvania

Ingot Rate Up to 16 Per Cent, With Sheet Mills Running at 40 to 60 Per Cent—Scrap Makes Further Advance

PHILADELPHIA, May 16.—Moderate expansion in steel orders has continued over the past week. While the automotive industry still is the largest single factor in the market, there has been a spread of diversified buying. Among those more active in the market are jobbers, construction interests and the breweries. Railroad purchases also have increased slightly, but remain at an extremely low level.

The price structure shows a firm tone generally. Reinforcing bars have been marked up to 1.50c., Pittsburgh, cut to length for distributers, an advance of $4 per ton. Scrap continues its upward trend, with No. 1 heavy melting steel advanced 50c. to a range of $9 to $9.50.

Steel works operations have increased one point to 16 per cent of capacity. The Bethlehem Steel Corpn. is starting up its rail mill at Steelton, Pa.

Pig Iron

The new price levels are being maintained. While tonnages taken at the higher prices are confined to small quantities, inquiry has increased and comes principally from foundries. Several inquiries have been put out for fourth quarter delivery, but sellers are limiting quotations to the second and third quarters.

Warehouse Business

Jobbers report only a slight improvement in demand. Prices are unchanged.

Sheets

Fair-sized tonnages of full-finished sheets continue to be placed with Eastern mills. One sheet mill is operating at 60 per cent of capacity and another at 40 per cent. Prices generally are holding up well, though there are reports of infrequent shading of 2.70c., Pittsburgh, for galvanized sheets.

Imports

The following iron and steel imports were received here last week: 200 tons of ferromanganese from Norway, 6 tons of hoop steel from Belgium and 4 tons of galvanized steel strips from England.

Plates, Shapes and Bars

Improvement in demand is reflected mostly in shape and merchant steel bar requirements, with a smaller increase in plate inquiry. Jobbers are buying more freely for stock, while tonnage for tanks is being placed by breweries. The construction industry also is a little more active in the market. The advance in the price of reinforcing bars to 1.50c., Pittsburgh, cut to length for distributers, makes the Philadelphia delivered price 1.81c. Demand for reinforcing bars in this district is light. Cruse-Kemper Co., Ambler, Pa., has taken the general contract for a new gas holder and the enlargement of another for the Philadelphia Gas Co., requiring about 2500 tons of plates and 1000 tons of shapes.

Scrap

The market is still moving upward. Some buyers believe prices will halt soon and possibly recede slightly, though the view is not shared by dealers, who believe that if steel operations continue to rise a like move will be reflected in old material. No. 1 heavy melting steel has been increased 50c. a ton to a range of $9 to $9.50, delivered, still well below basic pig iron at $14.25, furnace. The most activity the past week has been in No. 2 heavy melting steel, which has moved up 50c. to a range of $7.50 to $8. Other grades have made a similar advance. The higher prices have increased tonnages gathered and dealers have adopted a cautious policy in selling.

Sharp Gain in Pig Iron Buying in Cincinnati

CINCINNATI, May 16.—A rush of district consumers to cover before the effective date of price increases on pig iron, the past week, brought demand to the highest level in the past two years. Total bookings were about 4000 tons, of which 200 tons was silvery in one order for shipment into Indiana. In addition to local bookings, an Indiana melter ordered 3000 tons of malleable from undisclosed sources in other districts. Following the increase in Lake furnace prices at $15.50, base, Cleveland, a southern Ohio furnace advanced its quotations to $16.25, base, for local delivery, and $16, base, for outside shipment, bringing the delivered price in Cincinnati to $17.01.

One south central Ohio melter took 700 tons of Northern foundry iron, the past week, another bought 500 tons, and three others contracted for 200 tons each. An Indiana user placed an order for 500 tons of Northern foundry iron, while another took 100 tons. Revival of strength in the silvery market is reflected in announced advances in quotations, the new schedule for seven to eight per cent being $21.39, d livered in Cincinnati, with 50c. differentials. Foundry operations, while slightly improved, do not reflect the steady uptrend in iron demand. The stove, jobbing and some automotive foundries have increased their melt, but machine tool foundries are without appreciable business. Inquiry is lacking, current bookings having been without previous request for quotations.

Coke

Moderate increase in foundry coke shipments is noted, but there is little new business.

Steel

Demand for finished sheets, the past week, was near 50 per cent of capacity. Rolling schedules are still in keeping with demand, although a small backlog is being retained. Bookings are still well diversified, with automobile manufacturers and refrigerator builders taking their normal portion of the total bookings. Prices are steady and consumers are not exerting any noticeable pressure. Purchasing is done freely with some conviction that price increases for third quarter are inevitable.

Scrap

Failure of improved dealers' bids to attract material into the market has halted the rapid rise in prices. New business is curtailed by lack of material and refusal of mills to pay better prices to insure dealers a moderate profit.

Scrap Continues to Rise at St. Louis

ST. LOUIS, May 16.—Pig iron melt shows further moderate expansion, and deliveries to foundries so far this month are at a slightly higher rate than obtained in April. Spot purchasing has receded slightly, but there is a good volume of inquiry outstanding, some of it for third quarter. Jobbing foundries are accounting for most of current foundry activity, these interests having booked a substantial volume of orders for miscellaneous castings. Prices are firm, all recent sales having been at full list quotations, and carrying full silicon differentials.

Steel

There has been a further gain in open-hearth operations in this area, the rate now being approximately 25 per cent of capacity. American Steel Foundries, Laclede Steel Co., Granite City Steel Co. and Scullin Steel Co. increased their operations, and a further increase is likely by two of the companies in the near future. Plate demand is holding its own, and automotive releases are somewhat freer. Railroads are inquiring for tonnage for use in connection with box car repairs for handling the winter wheat movement. New fabricating jobs are of no great consequence, but structural shops are maintaining operations at the rate of earlier this month and are disposed to cover requirements.

Road building and river and levee improvement work are opening up in volume, and will require heavy tonnages of steel during the next six months. Warehouse business continues to expand moderately, with brewery requirements figuring prominently in current volume. The general manufacturing trade is steadily improving, with some industries, notably refrigeration and glass, exhibiting marked activity.

Scrap

Prices continue to ascend, advances of from 50c. to $1.50 having been superimposed on the recent markups. The chief transaction of the week was the purchase of 5000 tons of heavy melting steel by a district mill, for delivery over the next two or three months. Prices paid for this tonnage are understood to be at or close to the full recent advance. Dealers find difficulty in getting the material to apply on some recent sales. The attitude of sellers is extremely bullish, and short sales have disappeared entirely from the picture. The upturn has loosened up considerable railroad scrap, and more is in prospect. Latest offerings include the following: Missouri Pacific, 140 cars; Wabash, 7000 tons; Nickel Plate, 3000 tons; Rock Island, 2000 tons; Chesapeake & Ohio, 4000 tons; International & Great Northern, 5000 tons; and Illinois Central, 8000 tons.

Pig Iron Sales Gain at Boston

BOSTON, May 16.—Pig iron sales the past week were approximately 2500 tons, or some 300 tons larger than for the preceding week. One 500-ton lot and two of 300 tons constituted the largest individual transactions, with deliveries extending up to and including September. Alabama iron sold on a basis of $11 a ton, furnace, for No. 2 plain, thus establishing a new market base. Indian iron has again become a market factor, with sales at $16 a ton on dock here, duty paid, and higher. The Mystic Iron Works intimates it will shortly establish 50c. a ton differentials. A further slight increase in the New England melt is noted, and a still better showing is expected this week when stove makers begin to speed up operations.

The scrap market is more animated than it has been during the past two years, but a large part of the activity is confined to making quotations. In some instances brokers are working from early morning until late at night in an effort to keep up with their correspondence. Actual transactions are in larger volume than heretofore, but there is still much room for improvement. The market for the most active materials is a shade easier.

Reinforcing steel bars are firmer because mills and their representatives are holding to 1.91c. a lb., Boston, in carload lots, or 1.55c., on cars, Buffalo.

Steel Demand Well Maintained in New York Sales Territory

Advance in Reinforcing Bars Drives in Covering Orders—Sellers Pin Hopes on Release of Public Projects

NEW YORK, May 16.—Specifications for tin plate and sheets remain in good volume, although possibly not so heavy as in the previous two weeks. The advanced prices on sheets and hot-rolled strip are firmly held, but have not actually been obtained on much tonnage in view of heavy covering at the old figures. An advance of $4 a ton on reinforcing bars, which has just been announced by a number of mills, has likewise had the effect of causing buyers to cover. Reports continue to be heard of a possible advance of 25c. a base box on tin plate effective July 1, but verification cannot be obtained. Increases in the cost of tin and scrap are cited as justification for such a move. Tin plate was reduced 50c. a base box in December, 1932.

Higher prices may also be named on shapes, plates and mild steel bars, although the demand for these products remains exceedingly low in this district and plate prices continue weak, with concessions below 1.40c., Coatesville, still reported. The hopes of sellers of heavy rolled products are centered on the early release of public projects on which bids have been taken. Among these is a State bridge at Hartford, Conn., requiring 10,000 to 12,000 tons, on which figures were received at the end of March. The convening of the legislature this week may result in an early award. A New York State project, the Rip Van Winkle bridge between Hudson and Catskill, N. Y., and requiring 12,000 tons, will come up for figures June 1. Since this is to be a toll bridge, coming under the self-liquidating qualification, aid from the Reconstruction Finance Corporation will no doubt be obtained.

The Federal public works program is by no means entirely in the formative stage. Bids were taken a couple of months ago on close to 40 Federal jobs which, it is believed, will soon be placed.

Pipe demand is quiet, but the general contract for the cracking stills at the new Houston, Tex., refinery of the Pan-American Petroleum & Transport Co. has been awarded to the M. W. Kellogg Co., New York. About 2500 tons of plates are required. Figures have not yet been taken on the remainder of the plant, which includes tanks calling for 5000 tons of steel and miscellaneous structures requiring 2500 tons.

Early action is expected on a New York Central inquiry for 7000 tons of rails.

Pig Iron

Trading has slackened. Total sales in the past week were only 3500 tons, contrasted with 6500 tons in the preceding period and 5000 tons two weeks ago. Open inquiry is still light. General consumer interest is sustained, however, by prospects of further increases in prices. Buffalo producers are reported to be contemplating an advance in their base schedules, but such action will probably be contingent upon price trends in other districts. For example, Buffalo brands at the present base price of $14, furnace, are still non-competitive on a delivered basis at certain Eastern consuming points, in spite of the recent advance of $1 a ton on eastern Pennsylvania iron. Prospective barge movement of Buffalo iron on the State Canal is indefinite, in view of the uncertainty of water rates for the current season. A moderate movement is expected to occur for delivery at Beacon, N. Y., but for shipment to the metropolitan area the outlook is momentarily vague. Continued improvement in foundry melt is indicated by freer acceptance of pig iron and coke shipments against standing contracts.

Reinforcing Bars

Prices are strong. Several distributers have been notified by bar mills that an advance of $4 a ton will soon be effected. Meanwhile, quotations outstanding on the basis of 1.40c., Pittsburgh, will be protected probably through May. Requirements of bars for the Rip Van Winkle bridge at Catskill, N. Y., have not yet been established, but a sizable tonnage will likely be needed for that project. State road construction in New York accounts for a notable improvement in small-lot specifications. Lettings in the past were small. The only important award reported covered 400 tons for prison buildings at Dannemora, N. Y.

Scrap

Heavy melting steel prices are slightly easier. No. 1 is being purchased at $5.75 to $6, and No. 2 at $4.50. Blast furnace grades are strong, as are rails for rolling and stove plate. The last-mentioned grade is being purchased by a dealer at $5 a ton, on barge, for delivery at Bayonne, N. J. Movement of scrap to domestic users is spreading. No. 2 steel and blast furnace scrap are being shipped to Buffalo. Export activity is confined to loadings against existing contracts. Further export bookings hinge largely on future price trends in domestic markets.

Cleveland Steel Operations Are Stepped Up Further

Ingot Rate Now 41 Per Cent of Capacity—Pig Iron Prices Are Advanced—Scrap Loses Strength

CLEVELAND, May 16.—The volume of finished steel business has further expanded, although the gain is not so pronounced as during some of the previous weeks. Demand from the automotive industry is holding to the rate of the past few weeks. Orders from other sources are more numerous and are coming from consumers making widely diversified products. Business has come from some metal-working plants that have not ordered steel for several months. Two important sources of business, the structural fabricators and railroads, are supplying little tonnage.

Ingot output in Cleveland this week increased three points to 41 per cent of capacity. The Corrigan, McKinney Steel Co. put on an additional open-hearth furnace and is now operating ten. With eight active furnaces in Lorain, the greater Cleveland district is operating at 47 per cent of ingot capacity.

Advances of 50c. to $1 a ton were made on pig iron Monday by Cleveland and other Lake furnaces and at the same time advances were made by Valley district producers, these advances putting foundry and malleable iron at a minimum of $15.50. The pig iron market continues quite active.

Finished steel prices are firm but unchanged. There is persistent talk of advances for the third quarter. A lull in activity has caused a slight weakening in scrap prices.

Pig Iron

Lake furnace prices have advanced 50c. to $1 a ton on foundry and malleable iron and advances have been made in the Valley and southern Ohio districts. Local furnaces have marked up their prices to $15.50, furnace, both for local delivery and for outside shipment. This is an advance of 50c. a ton for Cleveland and $1 a ton for outside shipment. Other Lake furnaces are now quoting $15.50 to $16. The Michigan price is now $16, furnace, a 50c. advance. The adoption of a uniform Cleveland price for local and outside delivery is a departure from the past practice of selling iron at a lower price for outside than for local delivery. Sales gained further during the week. A Dayton melter purchased 1000 tons of foundry iron and a Marion, Ind., foundry 2000 to 3000 tons of malleable iron, each lot being divided between two or more producers. One Cleveland producer reports sales aggregating 18,000 tons this month, and another Lake furnace interest sold 6000 tons during the week. Considerable new inquiry is pending, including one for 1500 tons and one for 1000 tons. Shipments this month are running about 100 per cent above April.

Sheets

The automotive industry continues to order sheets quite freely and the demand from other sources has expanded somewhat. Orders from jobbing stamping plants and steel barrel manufacturers show some gain and the improved activity of the stove manufacturers is being maintained. The refrigerator industry continues to take a good tonnage. Jobbers' orders for galvanized sheets have improved. The new prices are being maintained on new business, although most consumers were covered before the advance.

Strip Steel

Demand from the automotive industry is holding up well. Some new releases, mostly in hot-rolled material, came during the week from leading automobile plants that had previously ordered quite freely for May shipment. Quick deliveries are wanted on part of the material, although some will be used in June production. While carlot sales of hot-rolled strip have been made at the new 1.55c. price, most business is being placed against old 1.45c. contracts. Cold-rolled strip is unchanged at 1.80c. to 2c., Cleveland.

Bars, Plates and Shapes

Bars continue to move well. While the larger part of the tonnage is going to the automotive industry, there is an improvement in miscellaneous orders. Demand from the implement industry has increased. Bids for the Conneaut, Ohio, waterworks tank and pipe, requiring 300 tons, will be taken May 20. With little construction work developing, structural shapes are inactive. Merchant bars are firm at 1.65c., Cleveland.

Iron Ore

Interest has developed in the market to the extent that a few consumers are lining up their requirements for the season subject to whatever prices are established. Last year's prices are expected to be reaffirmed.

Scrap

In the absence of new demand from consumers the market has quieted down and prices are easier. Steelmaking and blast furnace grades are quoted 25c. to 50c. a ton less than a week ago. Some of the mills have been taking in scrap faster than they are using it and consequently have built up their stocks.

Canadian Business Moderately Improved

TORONTO, ONT., May 16.—Minor improvement is gradually appearing in the iron and steel industry of Canada. While no large contracts for steel or equipment have been awarded, there has been a pick-up in small awards. There is a good demand from mining companies, and business in machinery and tool sales has expanded on this account within the past few weeks. The British American Oil Co. recently placed an order with the Canadian Car & Foundry Co., Montreal, for 150 tank cars. Mills are closing orders for small tonnages of steel of various classifications, but very little demand is reported for structural steel. Steel works operations do not average much more than 12 per cent of capacity, but a few foundries are running on schedules up to 75 per cent.

New business in pig iron has improved within the past two or three weeks. Producers report orders totaling around 500 tons per week against an earlier rate or about 300 tons. Production is at a minimum, with but one stack blowing out of 11 in Canada. Prices are holding without change.

Trading in scrap is specialized, with only a few grades moving. Steel scrap is at a standstill in the local market, but Montreal dealers are preparing shipments of heavy melting steel and turnings for Britain. No. 1 machinery cast is the most active grade, but supplies are limited. Dealers are carrying big stocks of most grades in their yards, but are not adding to accumulations. Prices are unchanged.

Rochester Steel Treaters Elect

At the annual meeting of the Rochester chapter of the American Society for Steel Treating, May 8, the following officers and members of the executive committee were nominated and elected for the ensuing year:

Chairman, G. A. Lux, chief chemist, General Railway Signal Co.; vice-chairman, W. T. Morgan, metallurgist, Taylor Instrument Co.; secretary and treasurer, I. C. Matthews, research chemical engineer, Eastman Kodak Co.

Executive committee: J. I. Reid, manager of technical sales, Symington Co.; L. J. Sullivan, sales engineer, Rochester Gas & Electric Corpn.; J. M. Keating, assistant chemist, Camera Works, Eastman Kodak Co.; W. B. Huntley, manager of the Rochester division of the Brace-Mueller-Huntley Co.; F. G. Silva, superintendent of the Davenport Machine Tool Co.; C. M. Sears, manager of the R. C. Neal Co.

Fabricated Structural Steel

Awards Decline—New Projects in Small Volume

LETTINGS of 3750 tons are the smallest for any week this year and compare with 4700 tons in the previous week and 126,135 tons two weeks ago, when awards for superstructures for the San Francisco-Oakland bridge were reported. New projects are also light at 4250 tons, comparing with 38,310 tons last week. Awards for the week follow:

NORTH ATLANTIC STATES

New Haven, Conn., 215 tons, factory building for Berger Brothers, to Bethlehem Fabricators, Inc.

Philadelphia, 250 tons, addition to Federal Reserve building, to Lehigh Structural Steel Co.

Philadelphia, 1000 tons, gas holder and enlargements to present holder, Philadelphia Gas Works Co., to Cruse-Kemper Co., Ambler, Pa.

Ocean County, N. J., 105 tons, Beaver Dam bridge, to American Bridge Co.

SOUTH AND SOUTHWEST

Louisville & Nashville Railroad, 215 tons, bridge work in Tennessee, to Virginia Bridge & Iron Co.

Henderson, Ky., 250 tons, bridge, to Virginia Bridge & Iron Co.

CENTRAL STATES

Decatur, Ill., 100 tons, bridge for Illinois Central Railroad, to Mississippi Valley Structural Steel Co.

State of Missouri, 367 tons, highway bridges in Harrison County, to St. Joseph Structural Steel Co.

Franklin County, Mo., 130 tons, bridge, route 50, section 57A, to Stupp Brothers Bridge & Iron Co.

WESTERN STATES

Las Vegas, Nev., 450 tons, blending station for Boulder Dam, to Consolidated Steel Corpn.

Boulder City, Nev., 250 tons, trestles at Boulder Dam for Six Companies, to Consolidated Steel Corpn.

San Francisco, 400 tons, West Bay substructure of San Francisco-Oakland bridge, to an unnamed bidder.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

New York, 600 tons, Jewish Memorial Hospital.

Albion, N. Y., 200 tons, State institute for defective delinquent women.

Graterford, Pa., 200 tons, State industrial building.

State of Pennsylvania, 484 tons, highway bridges; bids May 26.

THE SOUTH

Louisville, Ky., 200 tons, brewery.

Valde Verde County, Tex., 820 tons, Devil's River bridge; Virginia Bridge & Iron Co. low bidder.

CENTRAL STATES

Moline, Ill., 700 tons, for International Harvester Co.

State of Missouri, 900 tons, highway bridges; 2400 tons of bridge work now on inquiry in this State.

WESTERN STATES

South San Francisco, 250 tons, Bayshore grandstand; bids under advisement.

San Francisco, 800 tons, County jail; MacDonald & Kahn, general contractors.

San Francisco, 4000 tons, Federal building; Chicago contractor has withdrawn bid, reported job will be readvertised.

FABRICATED PLATE

AWARDS

Philadelphia, 2500 tons, gas holder and alterations to present holder, Philadelphia Gas Works Co., to Cruse-Kemper Co., Ambler, Pa.

Wheeling, W. Va., 320 tons, two barges for Costanzo Transportation Co., to American Bridge Co.

Union Pacific Railroad, 270 tons, four retorts, to an unnamed fabricator.

NEW PROJECTS

Milton, Mass., 100 tons, two standpipes.

Houston, Tex., 2500 tons, cracking stills for Pan American Petroleum & Transport Co.; general contract awarded to M. W. Kellogg Co., New York.

Reinforcing Steel

Awards 860 Tons—New Projects, 880 Tons

Dannemora, N. Y., 400 tons, prison buildings to Milton Mfg. Co., Milton, Pa.

Bloomfield, N. J., 100 tons, post office, to Truscon Steel Co.

State of Indiana, 100 tons, road work to an unnamed bidder.

Los Angeles, 260 tons, outlet tunnel of San Gabriel Dam, to Concrete Engineering Co.

NEW REINFORCING BAR PROJECTS

Baltimore, 600 tons, export and import pier for Pennsylvania Railroad.

Washington, 150 tons, chemistry building for Howard University; Farrell Concrete Products Co., low bidder.

Fairbanks, Alaska, 131 tons, grammar and high school; Warrack Construction Co., low bidder.

Pipe Lines

Wisconsin Rapids Gas Co., Wisconsin Rapids, Wis., affiliated with Liquefied Natural Gas Corpn., Foshay Tower Building, Minneapolis, plans natural gas steel pipe line at Wisconsin Rapids and towns in Wood, Portage and Juneau counties. Central distributing plant will be built at Wisconsin Rapids.

Van F. Cameron, Kilgore, Tex., and East Texas Independent Oil Operators Association, W. M. McVey, president, same place, are interested in project to install 12-in. steel pipe line from East Texas oil fields to Lake Charles, La., and vicinity. Proposed to organize company to carry out development.

Board of Public Works, Seattle, let contract to Puget Sound Machinery Depot, Seattle, for installation of 78-in. steel pipe line for water supply from Lake Youngs to Grouse Ridge, at $373,323.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 31 for 1550 seamless drawn steel tubes for Brooklyn Navy Yard, and 1475 such tubes for Puget Sound yard (Schedule 75).

Cast Iron Pipe

New Haven Water Co., New Haven, Conn., plans installation of 8-in. pipe to replace present 4-in. line, in connection with extensions and improvements in system.

New Rochelle Water Co., New Rochelle, N. Y., has awarded 700 tons of 24-in. to United States Pipe & Foundry Co.

Thiells, N. Y., State Hospital has placed 180 tons for water project with Donaldson Iron Works.

Dobbs Ferry, N. Y., has purchased 101 tons of 6 and 8-in. from United States Pipe & Foundry Co.

Westminster, Md., plans pipe lines for extensions in water supply system. Bond issue of $200,000 is being arranged for project.

Fort Worth, Tex., plans installation of 12-in. line for water supply from Lake Worth.

El Paso, Tex., has opened bids on about 800 tons. American Cast Iron Pipe Co. is low on 200 tons and United States Pipe & Foundry low on 600 tons.

Cedar Rapids, Iowa, plans pipe line from Bever reservoir for water supply. Fund of $50,000 is being arranged for work.

Michigan City, Ind., has engaged engineers to design improvements in water system; wood-stave pipe to be replaced with cast iron.

San Francisco will take bids May 19 on 304 tons of 30-in.

Railroad Equipment

British American Oil Co., Toronto, has placed 150 tank cars with Canadian Car & Foundry Co., Ltd., Montreal.

International Harvester Co. is taking bids on repairs to three hopper coke cars.

Mellon Institute Describes Activities

The twentieth annual report of the Mellon Institute has been issued by director E. R. Weidlein to the trustees of the institution. An abstract of the report, relating to industrial research in the present economic crisis has been prepared by the Institute as reprinted from *Industrial and Engineering Chemistry*, April 20, 1933.

"The state of commercial dullness," states the report, "has had a profound effect upon industrial research in general. Not a few companies have been obliged to close their laboratories; many other concerns, mostly of larger size, have been forced by budgetary restrictions to reduce their investigational expenditures. But in a large number of manufacturing organizations research has been carried on extensively—in some instances as though conditions were normal—and in a small group of companies scientific investigation was courageously started for the first time, notwithstanding the inactivity in trade in their fields. In general, those scientifically managed corporations that, prior to 1930, benefited richly from the services of ably directed, competent research specialists have continued to sustain well-staffed laboratories; several of these companies have already profited from this support of applied science during the severe depression, and other rewards will come."

Steel Business Furniture, March and First Quarter

WASHINGTON, May 12.—Orders for steel business furniture in March totaled $419,260 compared with $448,638 in February, according to reports received by the Bureau of the Census from 36 manufacturers. For the first quarter of the current year orders totaled $1,420,239 against $2,512,268 in the corresponding quarter of last year. March orders for shelving furniture totaled $142,083 compared with $116,500 in February, according to reports received from 16 manufacturers. In the first quarter of 1933 orders for shelving furniture amounted to $364,294 compared with $744,081 in the corresponding period of last year.

Copper Sold at 7c.; Tin Buying Sustained; Lead, Zinc Quiet

Copper Points Toward Higher Level, Though Demand Lags—Zinc Off $1 a Ton Despite Advance in Ore Prices

NEW YORK, May 16.—Electrolytic copper continued its march to higher ground last week, advancing ¼c. a lb. on May 12 to a basis of 7c., delivered Connecticut. A narrow demand greeted the higher price, but buying subsequently assumed generous proportions. Demand at the outset of the current week, however, has subsided perceptibly. Notwithstanding the fact that no sustained buying has accompanied the recent upswing in prices, sellers continue to entertain higher price views. Although fabricators have experienced a quickened demand from ultimate consumers, the improvement has been too meager to provide impulse for substantial buying of the red metal. To what extent copper values will advance without the background of significant increases in consumption is difficult to measure. Further moves, according to observers, will more than likely hinge chiefly on the eventual effects of proposed curtailment, the lenient attitude of the Government toward trade agreements, and inflationary influences. An indication that another price advance is imminent is the fact that scrap dealers are bidding for sizable quantities of scrap at prices based on 7.25c. a lb. for electrolytic.

Continental copper markets scored further advances during the week, with prices ranging from 6.60c. to 7.25c., c.i.f. usual ports. Fairly active buying accompanied the rise.

Tin

On a strong demand for spot and June delivery, Straits tin reached the peak for the current movement on May 11, when offerings were quoted at 36.87½c. a lb., New York. In sympathy with reactions in London, however, the New York price subsequently sought lower levels, settling today at around 35.87½c. The bulk of recent demand has emanated from tin plate and automobile manufacturers. Beer pipe makers have also been active buyers. Trading in London during the week matched the brisk activity here. Good price gains abroad were made last week, but part of the advance was wiped out in spite of sustained demand. The London market today was quotable at £184 a ton for spot standard, £182 6s. for future standard, and £199 10s. for spot Straits. The Singapore market, after having advanced to £205 5s. on May 12, declined more than £5 during the seven-day period to today's level at £197 15s. London stocks shrunk 435 tons last week and now stand at 26,012 tons. Shipments from the East in the first two weeks of May totaled 2544 tons.

Lead

This market has been quiet, but steady, throughout the week. Prices are firm at 3.65c., New York, and 3.52½c., St. Louis. With about 22,000 tons already sold for May delivery, further sales during the remainder of the month are expected to bring the total on a parity with April deliveries of 25,000 tons. About 50 to 60 per cent of June requirements have been covered.

Zinc

Strong pressure to sell Prime Western has resulted in price irregularities. Prompt and June metal is now quotable in some quarters at 3.70c. a lb., East St. Louis, or 4.07c., New York, a drop of $1 a ton from the quotation a week ago. While open demand is light, recent quiet bookings are reported to have involved sizable tonnages. Ore prices in the Joplin market advanced further last Saturday to $25 a ton for flotation and $26 a ton for mill grades. Ore sales for the week totaled 2450 tons, compared with 2700 tons in the preceding period. Production aggregated 3400 tons, against shipments of 2750 tons.

The Week's Prices. Cents Per Pound for Early Delivery

	May 10	May 11	May 12	May 13	May 15	May 16
Electrolytic copper, N. Y.*	6.50	6.50	6.75	6.75	6.75	6.75
Lake copper, New York	6.75	6.75	7.00	7.00	7.00	7.00
Straits tin, Spot, N. Y.	36.00	36.87½	36.75	....	35.65	35.87½
Zinc, East St. Louis	3.70	3.75	3.75	3.75	3.70	3.70
Zinc, New York	4.07	4.12	4.12	4.12	4.07	4.07
Lead, St. Louis	3.52½	3.52½	3.52½	3.52½	3.52½	3.52½
Lead, New York	3.65	3.65	3.65	3.65	3.65	3.65

*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 6.25c. a lb. New York.
Brass ingots, 85-5-5-5, 6.75c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	38.00c. to 39.00c.
Tin, bar	40.00c. to 41.00c.
Copper, Lake	8.00c. to 8.75c.
Copper, electrolytic	7.75c. to 8.25c.
Copper, castings	7.50c. to 8.50c.
*Copper sheets, hot-rolled	14.62½c.
*High brass sheets	12.37½c.
*Seamless brass tubes	14.00c.
*Seamless copper tubes	14.12½c.
*Brass rods	9.87½c.
Zinc, slabs	5.00c. to 5.50c.
Zinc sheets (No. 9), casks	9.25c. to 9.50c.
Lead, American pig	4.62½c. to 5.62½c.
Lead, bar	6.00c. to 7.00c.
Lead, sheets	7.25c.
Antimony, Asiatic	8.00c. to 9.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent	16.00c. to 17.00c.
Solder, ½ and ½	23.50c. to 24.50c.
Babbitt metal commerical grade	21.00c. to 42.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	40.50c.
Tin, bar	42.50c.
Copper, Lake	7.87½c.
Copper, electrolytic	7.87½c.
Copper, casting	7.62½c.
Zinc, slab	4.50c. to 5.00c.
Lead, American pig	4.37½c. to 4.87½c.
Lead, bar	7.75c.
Antimony, Asiatic	8.50c.
Babbitt metal, medium grade	17.75c.
Babbitt metal, high grade	44.50c.
Solder, ½ and ½	24.25c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	5.25c.	6.00c.
Copper, hvy. and wire	5.00c.	5.875c.
Copper, light and bottoms	4.00c.	4.75c.
Brass, heavy	2.75c.	3.25c.
Brass, light	2.25c.	2.625c.
Hvy. machine composition	3.625c.	4.25c.
No. 1 yel. brass turnings	3.00c.	3.625c.
No. 1 red brass or compos. turnings	3.50c.	4.00c.
Lead, heavy	2.625c.	3.25c.
Zinc	1.75c.	2.25c.
Cast aluminum	4.75c.	6.00c.
Sheet aluminum	9.75c.	11.50c.

Sharp Gain in Barrel Output

WASHINGTON, May 12.—The production of steel barrels in March rose sharply to 373,340 units, or 27.2 per cent of capacity, from 269,755, or 19.7 per cent of capacity, in February, according to reports received by the Bureau of the Census from 26 establishments. In the first three months of the current year output totaled 935,296 barrels or 22.6 per cent of capacity, compared with 1,179,451 or 27.3 per cent of capacity in the corresponding period of last year.

Unfilled orders at the end of March rose to 510,737 barrels from 453,083 at the end of February. Unfilled orders for delivery within 30 days from the end of March totaled 94,424, while the total for delivery beyond 30 days was 416,313.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
Del'd Philadelphia	1.91c.
Del'd New York	1.95c.
Del'd Detroit	1.80c.
F.o.b. Cleveland	1.65c.
F.o.b. Lackawanna	1.70c.
F.o.b. Birmingham	1.75c.
C.i.f. Pacific ports	2.10c.

Billet Steel Reinforcing

(Cut lengths as quoted by distributers)

F.o.b. P'gh mills	1.55c. to 1.75c.
F.o.b. Birmingham	1.55c.
F.o.b. Cleveland	1.55c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.30c.
F.o.b. Chicago Heights mills	1.50c.

Iron

Common iron, . . . Chicago	1.60c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	1.86c.
Common iron, del'd New York	1.90c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.50c. to 1.60c.
F.o.b. Chicago	1.70c.
F.o.b. Birmingham	1.75c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.4935c. to 1.5935c.
F.o.b. Coatesville	1.40c. to 1.50c.
F.o.b. Sparrows Point	1.40c. to 1.50c.
Del'd New York	1.598c. to 1.698c.
C.i.f. Pacific ports	2.00c.
Wrought iron plates, f.o.b. P'gh	3.00c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
F.o.b. Birmingham	1.75c.
F.o.b. Lackawanna	1.70c.
F.o.b. Bethlehem	1.70c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.7495c.
Del'd New York	1.86775c.
C.i.f. Pacific ports (standard)	2.16c.
C.i.f. Pacific ports (wide flange)	2.20c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago mill	2.05c.
F.o.b. Buffalo	2.00c.

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago, Buffalo, Massillon or Canton.)

Alloy Quantity Bar Base, 2.45c. to 2.65c. per Lb.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
2000 (½% Nickel)	$0.25
2100 (1½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.16 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
6100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
9250 Silicon Manganese Spring Steel (flats)	0.25
Rounds and Square	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finish alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Cold Finished Bars*

Bars, f.o.b. Pittsburgh Mill	1.70c.
Bars, f.o.b. Chicago	1.75c.
Bars, Cleveland	1.75c.
Bars, Buffalo	1.75c.
Bars, Detroit	1.90c.
Bars, eastern Michigan	1.95c.
Shafting, ground, f.o.b. mill, 1⅛ in.	3.00c.
1-3/16 to 1½ in.	2.50c.
1-9/16 to 1⅞ in.	2.35c.
1-15/16 to 2⅛ in.	2.20c.
2-15/16 to 6 in.	2.05c.

* In quantities of 10,000 to 19,999 lb.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot-Rolled

No. 10, f.o.b. Pittsburgh	1.40c. to 1.50c.
No. 10, f.o.b. Chi'o mill	1.50c. to 1.60c.
No. 10, del'd Philadelphia	1.71c. to 1.81c.
No. 10, f.o.b. Birming'm	1.55c. to 1.65c.
No. 10, c.i.f. Pacific Coast Ports	2.12½c.

Hot-Rolled Annealed

No. 10, Pittsburgh	1.55c. to 1.65c.
No. 10, Chicago mills	1.65c. to 1.75c.
No. 10, Birmingham	1.70c. to 1.80c.
No. 10, Pacific Coast ports	2.27½c.
No. 10, wrought iron, Pittsburgh	3.60c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.00c. to 2.10c.
No. 24, f.o.b Chi'o mills	2.10c. to 2.20c.
No. 24, del'd Philadelphia	2.31c. to 2.41c.
No. 24, f.o.b. Birming'm	2.15c. to 2.25c.
No. 24, c.i.f. Pacific Coast ports	2.75c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pitts'h	1.90c. to 2.05c.
No. 10 gage, f.o.b. Chicago mills	2.00c. to 2.15c.
No. 10 gage, del'd Phila.	2.21c. to 2.36c.
No. 10 gage, del'd Pacific Coast ports	2.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pitts'h	2.30c. to 2.45c.
No. 20 gage, f.o.b. Chicago mills	2.40c. to 2.55c.
No. 20 gage, del'd Phila.	2.61c. to 2.76c.
No. 20 gage, del'd Pacific Coast ports	2.95c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.70c.
No. 24, f.o.b. Chicago mill	2.80c.
No. 24, del'd Philadelphia	3.01c.
No. 24, f.o.b. Birmingham	2.85c.
No. 24, c.i.f. Pacific Coast ports	3.25c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Terne

No. 24, unassorted, 8-lb. coating, f.o.b. Pittsburgh	4.75c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	2.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.30c.
No. 28, Chicago mill	2.40c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mill	$4.25
Standard cokes, f.o.b. Gary	4.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$8.70
15-lb. coating I.C.	11.00
20-lb. coating I.C.	11.90
25-lb. coating I.C.	13.00
30-lb. coating I.C.	13.80
40-lb. coating I.C.	15.30

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., Pittsburgh	1.45c. to 1.55c.
All widths up to 24 in., Chicago	1.55c. to 1.65c.
Cooperage stock, P'gh	1.50c. to 1.65c.
Cooperage stock, Chicago	1.60c. to 1.65c.

Cold-Rolled Strips

F.o.b. Pittsburgh	1.80c. to 2.00c.
F.o.b. Cleveland	1.80c. to 2.00c.
Del'd Chicago	2.20c. to 2.30c.
F.o.b. Worcester	2.00c. to 2.10c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	2.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

Extras of 10c. a 100 lb. on mixed and joint carloads, 20c. on peel carloads and 30c. on less than carloads are applied on all merchant wire products. In carloads and mixed carloads a discount of 10 per cent on extras is allowed.

To Manufacturing Trade

Bright wire	2.10c.
Spring wire	3.10c.

To Jobbing Trade

	Base per Keg
Standard wire nails	$1.85
Smooth coated nails	1.85
Galvanized nails	3.35
	Base per 100 Lb.
Smooth annealed wire	$2.25
Smooth galvanized wire	2.60
Polished staples	2.55
Galvanized staples	2.80
Barbed wire, galvanized	2.35
Woven wire fence No. 9 gage, base column, per net ton	$50.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base; Duluth, Minn. and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio Mills

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Wrought Iron Inches	Wrought Iron Black	Wrought Iron Galv.
⅛	55	23	⅛	+91½	+138
¼ to ⅜	60½	42	¼ & ⅜	+11½	+21½
½	65½	54	½	31½	15
¾	69	59	¾	36½	20½
1 to 3	71	62	1 to 1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	66	57	2	37	22½
2½ to 6	69½	60½	2½ to 3½	38	25
7 and 8	68	58	4 to 8	40	28½
9 and 10	67	57	9 to 12	38	24½
11 and 12	66	56			

Butt Weld, extra strong, plain ends

⅛	52	37	⅛	+13	+45½
¼ to ⅜	58	45	¼ & ⅜	+2½	+34½
½	63½	54½	½	32½	17½
¾	68	59	¾	37½	22½
1 to 3	70	62	1 to 2	43½	29

Lap Weld, extra strong, plain ends

2	65	57	2	40	26
2½ to 6	69	61	2½ to 4.45	45½	33
7 to 8	68	58	4½ to 6.45	45	32½
9 and 10	67	57	7 & 8	46	33
11 and 12	66	56	9 to 12	41½	30

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered bases is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—4½ in.	54	2½ in.—3¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold-Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

Rails

	Per Gross Ton
Standard, f.o.b. mill	$40.00
Light (from billets), f.o.b. mill	30.00
Light (from rail steel, f.o.b. mill)	26.00

Track Equipment

	Base per 100 Lb.
Spikes, 9/16 in. and larger	$2.15
Spikes, ½-in. and larger	2.30
Spikes, boat and barge	2.60
Tie plates, steel	1.75
Angle bars	2.55
Track bolts, to steam railroads	3.50
Track bolts, to jobbers, all sizes, (per 100 count)	73 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	75
Carriage bolts	75
Lag bolts	75
Plow bolts, Nos. 1, 2, 3 and 7 heads	75
Hot-pressed nuts, blank or tapped, square	75
Hot-pressed nuts, blank or tapped, hexagons	75
C.p.c. and t. square or hex nuts, blank or tapped	75

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	75
Semi-finished hexagon castellated nuts, S.A.E.	75
Stove bolts in packages, P'gh, 75, 25 and 10	
Stove bolts in packages, Ch'go, 75, 25 and 10	
Stove bolts in pkgs., Cleveland, 75, 25 and 10	
Stove bolts in bulk, P'gh	80
Stove bolts in bulk, Chicago	80
Stove bolts in bulk, Cleveland	80
Tire bolts	60 and 10

Discounts of 75 per cent off on bolts and nuts applied on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

	Base per Lb.
F.o.b. Pittsburgh or Cleveland	$2.25
F.o.b. Chicago	2.35

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 10
F.o.b. Cleveland	70, 10 and 10
F.o.b. Chicago	70, 10 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 250 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	85
Milled standard set screws, case hardened, 1 in. dia. and smaller	80
Milled headless set screws, cut thread ⅜ in. and smaller	75 and 10
Upset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller	85 and 10
Upset set screws, sq. head	80
Milled studs	70

SEMI-FINISHED STEEL

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. to 6-in., inclusive Pittsburgh	$26.00
Rerolling, 4-in. to 6-in., inclusive Youngstown	26.00
Rerolling, 4-in. to 6-in., inclusive Cleveland	26.00
Rerolling, 4-in. to 6-in., inclusive Chicago	26.00
Forging quality, Pittsburgh	31.00
Forging quality, Youngstown	31.00

Sheet Bars

(Open-Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$26.00
Youngstown	26.00
Cleveland	26.00

Slabs

(3 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$26.00
Youngstown	26.00
Cleveland	26.00

(Turn to next page)

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$35.00
Cleveland	35.00
Chicago	36.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$1.75 to $2.00
Foundry, f.o.b. Connellsville Prompt	2.50 to 4.00
Foundry, by-product, Chicago ovens, for delivery outside switching districts	7.00
Foundry, by-product, delivered in Chicago switching district	7.75
Foundry, by-product, New England, delivered	10.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	8.50
Foundry, by-product, Cleveland, delivered	7.82
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.00 to $1.15
Mine run coking coal, f.o.b. W. Pa.	1.10 to 1.25
Gas coal, ¾-in., f.o.b. Pa. mines	1.25 to 1.40
Mine run gas coal, f.o.b. Pa. mines	1.20 to 1.30
Steam slack, f.o.b. W. Pa. mines	0.25 to 0.35
Gas slack, f.o.b. W. Pa. mines	0.35 to 0.45

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. f.o.b. Baltimore	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. del'd Chicago	
No. 3 industrial fuel oil	3.25c.
No. 5 industrial fuel oil	2.65c. to 2.75c.
Per Gal. f.o.b. Cleveland	
No. 3 distillate	5.00c.
No. 4 industrial	4.50c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works: High-heat Duty Brick	Intermediate Duty Brick
Penn.	$35.00	$30.00
Maryland	35.00	30.00
New Jer.	$44.00 to 57.00	
Ohio	35.00	30.00
Kentucky	35.00	30.00
Missouri	35.00	30.00
Illinois	35.00	30.00
Ground fire clay, per ton	6.50	

Chrome Brick

	Per Net Ton
Standard size	$42.50 to $45.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$38.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	$61.50 to $65.00
Unburned, f.o.b. Baltimore	52.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	$38.50 to 45.00
Domestic, f.o.b. Chewelah, Wash.	20.90

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$41.40
4-in., del'd Chicago	44.40
6-in., and larger, del'd New York,	$35.30 to 36.30
4 in., del'd New York	38.30 to 39.30
6-in., and larger, Birm'ham	33.00
4-in., Birmingham	36.00

Class "A" and gas pipe, $3 extra.

Pig Iron, Ores, Ferroalloys

VALLEY

Per Gross ton, f.o.b. Valley furnace:

Basic	$14.00 to $15.00
Bessemer	15.00 to 16.00
Gray Forge	14.50 to 15.50
No. 2 foundry	14.50 to 15.50
No. 3 foundry	14.00 to 15.00
Malleable	14.50 to 15.50
Low phos., copper free	23.00

Freight rate to Pittsburgh or Cleveland district, $1.89.

PITTSBURGH

Per Gross ton, f.o.b. Pittsburgh district furnace:

Basic	$14.50 to $15.50
No. 2 foundry	15.00 to 16.00
No. 3 foundry	14.50 to 15.50
Malleable	15.00 to 16.00
Bessemer	15.50 to 16.50

Freight rates to points in Pittsburgh district range from 69c. to $1.26.

CHICAGO

Per gross ton at Chicago furnaces:

N'th'n No. 2 fdy.	$16.00
N'th'n No. 1 fdy.	16.50
Malleable, not over 2.25 sil.	16.00
High phosphorus	15.50
Lake Super. charcoal, sil. 1.50, by rail	23.17
Southern No. 2 fdy.	$16.14 to 17.14
Low. phos., sil. 1 to 2, Copper free	25.00
Silvery, sil. 8 per cent	23.67
Bess. ferrosil'n, 15 per cent	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorous and malleable, which are f.o.b. local furnaces, not including a switching charge.

ST. LOUIS

Per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$15.50
Del'd St. Louis	16.35
Malleable, f.o.b. Granite City	16.00
Northern No. 2 fdy., del'd St. Louis	17.80
Northern malleable del'd	17.80
Northern basic, del'd	17.80
Southern fdy., sil. 1.75 to 2.25 del'd St. Louis	15.85

Freight rates $1.52 (average) Granite City to St. Louis; $2.30 from Chicago; $4.56 from Birmingham.

NEW YORK

Per Gross ton, delivered New York district:

*Buffalo, No. 2, del'd east N. J.	$17.41
Buffalo malleable, del'v'd Eastern N. J.	17.91
East Pa. No. 2 fdy.	16.02
East Pa. No. 2X fdy.	16.52

Freight rates: $1.52 to $2.63 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.41 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:

No. 2 fdy.	$16.00
No. 2X fdy.	16.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50
Lake Superior charcoal, del'd	23.41

CINCINNATI

Per gross ton, delivered Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$15.82
Ala. fdy., sil. 2.25 to 2.75	16.07
Tenn. fdy., sil. 1.75 to 2.25	15.82
N'th'n No. 2 foundry	$17.01 to 18.19
S'th'n Ohio silvery, 8%	21.39

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.82 from Birmingham.

CLEVELAND

Per gross ton at Cleveland furnace:

N'th'n No. 2 fdy.	$15.50
Malleable	15.50
Ohio silvery, 8 per cent	21.75
Stand. low. phos., Valley	23.00
Southern No. 2 fdy.	$16.14 to 17.14

Prices are f.o.b furnace except on Southern foundry and silvery iron. Freight rates; 63c. average local switching charge; $3.00 from Jackson, Ohio; $6.14 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:

East. Pa. No. 2	$15.34
East. Pa. No. 2X	15.84
East. Pa. No. 1X	16.34
Basic (del'd east. Pa.)	15.09
Malleable	15.84
Stand. low phos. (f.o.b. east Pa. furnace	$22.00 to $23.00
Cop. b'r'g' low phos. (f.o.b. furnace)	22.00 to 23.00
Va. No. 2	21.79
Va. No. 2X	22.29

Prices, except as specified otherwise, are delv'd Philadelphia. Freight rates: 84c. to $1.79 from eastern Pennsylvania furnaces; $4.67 from Virginia furnaces.

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnace:

No. 2 fdy., 1.75 to 2.25 sil.	$12.00
No. 2 soft, 2.25 to 2.75 sil.	12.50
Basic	12.00

NEW ENGLAND

Per gross ton delivered to most New England points:

*Buffalo, sil. 1.75 to 2.25	$19.30
*Buffalo, sil. 2.25 to 2.75	19.55
†Buffalo, sil. 1.75 to 2.25	18.28
†Buffalo, sil. 2.25 to 2.75	18.53
†Ala., sil. 1.75 to 2.25	$15.64 to 16.64
†Ala., sil. 2.25 to 2.75	16.14 to 17.14

Freight rates: $5.05 all rail from Buffalo, and $3.66 to $4.03 rail and water from Buffalo when $1.25 barge and $2.13 to New England freight rate are obtainable; $5.64 rail and water from Alabama to New England seaboard.

* All-rail rate.

† Rail-and-water rate.

CANADA

Per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.75	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	23.00 to 23.50

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$68.00
Foreign, 80%, Atlantic or Gulf port, duty paid	61.00

Prices for lots of one carload or more; extras applied on less than carload lots.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$24.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$74.50
50% (less carloads)	82.00
75% (carloads)	120.00
75% (less carloads)	130.00
4% to 16% (f.o.b.) Welland, Ont. (in carloads)	31.00
14% to 16% (less carloads)	36.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$21.50	14%	$23.50
11%	22.00	15%	24.00
12%	22.50	16%	24.50
13%	23.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$19.00	12%	$22.00
7%	19.50	13%	22.50
8%	20.00	14%	23.00
9%	20.50	15%	23.50
10%	21.00	16%	24.00
11%	21.50		

Other Ferroalloys

Ferrotungsten, per lb. wp. del., carloads	94c.
Ferrotungsten, less carloads	$1.00
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr, delivered, in carloads	9.50c.
Ferrochromium, 2% carbon	16.50c to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained Va.	$2.60 to $2.80
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace in carloads	100.00
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c
Calcium molybdate, per lb. Mo., del.	90c
Silico spiegel, per ton, f.o.b. furnace, car lots	$36.00
Ton lots or less, per ton	41.00
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00
Spot prices	$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.5% iron	$4.85
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorous, 51.50% iron	4.60

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	8c. to 8.50c.
Iron, low phos., Swedish, average 68½% iron	9c.
Iron, basic or foundry, Swedish, average, 65% iron	8c.
Iron, basic or foundry, Russian, aver. 63% iron (nom.)	8c.
Manganese, Caucasian, washed 52%	*22c.
Manganese, African, Indian, 50-52%	*21c. to 22c.
Manganese, Brazilian, 46 to 48%	*12c.

	Per Net Ton Unit
Tungsten, Chinese wolframite, duty paid	$10.00

	Per Gross Ton
Tungsten, domestic scheelite	$8.00 to $10.00
Chrome, 45%, Cr_2O_3, crude, c.l.f. Atlantic seaboard	16.00
Chrome, 48%, Cr_2O_3, c.l.f. Atlantic seaboard	18.00

*Quotations nominal in absence of sales

Fluorspar

	Per Net Ton
Domestic, washed gravel 85-5, f.o.b. Kentucky and Illinois mines	$10.50 to $11.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	12.50
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	$16.00 to 16.75
Domestic, No. 1 ground bulk, 85 to 98% calcium, fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	20.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$11.50 to $12.00
No. 2 heavy melting steel	10.00 to 10.50
No. 2 railroad wrought	11.50 to 12.00
Scrap rails	11.50 to 12.00
Rails 3 ft. and under	12.50 to 13.00
Sheet bar crops, ordinary	12.00 to 12.50
Compressed sheet steel	11.00 to 11.50
Hand bundled sheet steel	10.00 to 10.50
Hvy. steel axle turnings	10.00 to 10.50
Machine shop turnings	8.25 to 8.75
Short shov. steel turnings	8.25 to 8.75
Short mixed borings and turnings	7.50 to 8.00
Cast iron borings	7.50 to 8.00
Cast iron carwheels	11.00 to 11.50
Heavy breakable cast	9.00 to 9.50
No. 1 cast	10.00 to 11.00
Railr. knuckles and couplers	13.00 to 14.00
Rail, coil and leaf springs	13.00 to 14.00
Rolled steel wheels	13.00 to 14.00
Low phos. billet crops	14.00 to 14.50
Low phos. sheet bar crops	13.50 to 14.00
Low phos. plate scrap	13.50 to 14.00
Low phos. punchings	13.50 to 14.00
Steel car axles	13.00 to 13.50

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$8.25 to $8.75
Shoveling steel	8.25 to 8.75
Hydraulic comp. sheets	$7.00 to $7.50
Drop forge flashings	6.25 to 6.75
No. 1 busheling	7.00 to 7.50
Rolled carwheels	9.50 to 10.00
Railroad tires	9.50 to 10.00
Railroad leaf springs	9.50 to 10.00
Axle turnings	7.00 to 7.50
Steel couplers and knuckles	9.50 to 10.00
Coil springs	9.50 to 10.00
Axle turnings (elec. fur.)	7.50 to 8.00
Low phos. punchings	9.50 to 10.00
Low phos. plates, 12 in. and under	9.50 to 10.00
Cast iron borings	5.00 to 5.50
Short shoveling turnings	5.00 to 5.50
Machine shop turnings	5.00 to 5.50
Rerolling rails	9.50 to 10.00
Steel rails, less than 3 ft.	9.50 to 10.00
Steel rails, less than 2 ft.	10.00 to 10.50
Angle bars, steel	9.50 to 10.00
Cast iron carwheels	9.50 to 10.00
Railroad malleable	9.75 to 10.25
Agricultural malleable	7.50 to 8.00

Per Net Ton

Iron car axles	$12.50 to $13.00
Steel car axles	10.50 to 11.00
No. 1 railroad wrought	6.50 to 7.00
No. 2 railroad wrought	7.50 to 8.00

No. 2 busheling	$4.00 to	$4.50
Locomotive tires, smooth	7.50 to	8.50
Pipe and flues	1.25 to	1.75
No. 1 machinery cast	8.75 to	9.25
Clean automobile cast	8.75 to	9.25
No. 1 railroad cast	8.50 to	9.00
No. 1 agricultural cast	8.00 to	8.50
Stove plate	7.00 to	7.50
Grate bars	6.75 to	7.25
Brake shoes	8.00 to	8.50

* Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$9.00 to	$9.50
No. 2 heavy melting steel	7.50 to	8.00
No. 1 railroad wrought	....	11.00
Bundled sheets	4.00 to	4.50
Hydraulic compressed, new	....	6.00
Hydraulic compressed, old	....	5.00
Machine shop turnings	5.00 to	5.50
Heavy axle turnings	7.50 to	8.00
Cast borings	3.50 to	3.75
Heavy breakable cast	....	9.50
Stove plate (steel works)	7.00 to	7.50
No. 1 low phos heavy	11.00 to	11.50
Couplers and knuckles	10.00 to	10.50
Rolled steel wheels	10.00 to	10.50
No. 1 blast furnace	3.50 to	3.75
Spec. iron and steel pipe	....	8.00
Shafting	13.00 to	13.50
Steel Axles	13.00 to	13.50
No. 1 forge fire	5.50 to	6.00
Cast iron carwheels	9.50 to	10.00
No. 1 cast	10.00 to	10.50
Cast borings (chem.)	10.00 to	10.50
Steel rails for rolling	9.50 to	10.00

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$9.00 to	$9.50
No. 2 heavy melting steel	8.50 to	9.00
Compressed sheet steel	9.00 to	9.50
Light bundled sheet stampings	6.50 to	7.00
Drop forge flashings	8.00 to	8.50
Machine shop turnings	5.75 to	6.00
Short shoveling turnings	6.75 to	7.25
No. 1 busheling	7.50 to	8.00
Steel axle turnings	7.50 to	8.00
Low phos., billet crops	12.00 to	12.50
Cast iron borings	6.25 to	6.75
Mixed borings and short turnings	6.25 to	6.75
No. 2 busheling	6.25 to	6.50
No. 1 cast	10.00 to	10.50
Railroad grate bars	5.50 to	6.00
Stove plate	5.50 to	6.00
Rails under 3 ft.	8.50 to	9.00
Rails for rolling	10.00 to	10.50
Railroad malleable	10.00 to	10.50
Cast iron carwheels	....	11.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$10.00 to	$10.50
No. 2 heavy melting scrap	8.50 to	9.00
Scrap rails	7.00 to	7.50
New Hydraul. comp. sheets	8.50 to	9.00
Old hydraul. comp. sheets	7.50 to	8.00
Drop forge flashings	8.50 to	9.00
No. 1 busheling	8.50 to	9.00
Hvy. steel axle turnings	6.50 to	7.00
Machine shop turnings	4.50 to	5.00
Knuckles and couplers	9.00 to	9.50
Coil and leaf springs	9.00 to	9.50
Rolled steel wheels	9.00 to	9.50
Low phos. billet crops	11.50 to	12.00
Short shov. steel turnings	6.50 to	7.00
Short mixed borings and turnings	3.75 to	4.25
Cast iron borings	3.75 to	4.25
No. 2 busheling	3.50 to	4.00
Steel car axles	10.00 to	11.00
Iron axles	10.00 to	11.00
No. 1 machinery cast	10.00 to	10.50
No. 1 cupola cast	9.00 to	9.50
Stove plate	7.50 to	8.00
Steel rails, 3 ft. and under	11.50 to	12.00
Cast iron carwheels	8.00 to	9.00
Industrial malleable	7.00 to	7.50
Railroad malleable	9.50 to	10.50
Chemical borings	7.50 to	8.00

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$7.00 to	$7.50
Scrap steel rails	7.00 to	7.50
Short shoveling turnings		4.00
Stove plate		6.00
Steel axles		9.00
Iron axles		9.00
No. 1 railroad wrought	4.50 to	5.00
Rails for rolling	7.50 to	8.00
No. 1 cast	8.00 to	8.50
Tramcar wheels		8.00
Cast iron borings, chem.		8.00

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$7.50 to	$8.00
No. 1 heavy melting	7.50 to	8.00
No. 2 heavy melting	7.25 to	7.75
No. 1 locomotive tires	6.00 to	6.50
Misc. stand-sec. rails	7.50 to	8.00
Railroad springs	8.50 to	9.00
Bundled sheets	3.50 to	4.00
No. 2 railroad wrought	7.75 to	8.25
No. 1 busheling	3.50 to	4.00
Cast iron borings and shoveling turnings	2.50 to	3.00
Rails for rolling	7.75 to	8.25
Machine shop turnings	2.50 to	3.00
Heavy turnings	4.00 to	4.50
Steel car axles	9.50 to	10.00
Iron car axles	11.00 to	11.50
Wrot. iron bars and trans.	6.25 to	6.75
No. 1 railroad wrought	5.25 to	5.75
Steel rails less than 3 ft.	10.00 to	10.50
Steel angle bars	8.00 to	8.50
Cast iron carwheels	6.00 to	6.50
No. 1 machinery cast	7.00 to	7.50
Railroad malleable	7.00 to	7.50
No. 1 railroad cast	6.25 to	6.75
Stove plate	6.50 to	7.00
Relay. rails, 60 lb. and under	16.00 to	16.50
Relay. rails, 30 lb. and over	$20.00 to	$21.00
Agricult. malleable	4.00 to	4.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$5.25 to	$5.50
Scrap T rails	5.00 to	5.50
Machine shop turnings	2.50 to	2.75
Cast iron borings	2.00 to	2.25
Bundled skeleton, long	3.25 to	3.50
Forge flashings	3.50 to	3.75
Shafting	7.50 to	8.50
Steel car axles	8.50 to	9.00
Wrought pipe	2.50 to	2.75
Rails for rerolling	6.00 to	6.50
Cast iron borings, chemical	7.25 to	7.75

Per gross ton delivered consumers' yards:

Textile cast	$6.50 to	$7.00
No. 1 machinery cast	6.50 to	7.00
Stove plate	4.25 to	4.50
Railroad malleable	8.00 to	10.00

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$5.75 to	$6.00
No. 2 heavy melting steel	....	4.50
Heavy melting steel (yard)	2.50 to	3.00
No. 1 heavy breakable cast	5.00 to	5.50
Stove plate (steel works)	3.00 to	3.25
Machine shop turnings	2.50 to	3.00
Short shoveling turnings	2.50 to	3.00
Cast borings	2.50 to	3.00
No. 1 blast furnace	2.50 to	3.00
Steel car axles	9.50 to	10.00
Spec. iron and steel pipe	$3.00 to	$3.25
Forge fire	2.75 to	3.00
No. 1 railroad wrought	5.00 to	5.50
No. 1 yard wrought long	3.50 to	3.75
Rails for rolling	5.50 to	6.00
No. 1 cast	5.50 to	5.75
No. 2 cast	4.50 to	4.75
Stove plate (foundry)	4.50 to	5.00
Cast borings (chemical)	6.00 to	6.50

Per gross ton, delivered local foundries:

No. 1 machinery cast		$9.00
No. 1 hvy. cast (cupola size)	7.50 to	8.00
No. 2 cast	5.00 to	5.50

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$7.25 to	$7.75
Scrap rails for melting	7.25 to	7.75
Loose sheet clippings	1.75 to	2.25
Bundled sheets	4.25 to	4.75
Cast iron borings	3.50 to	4.00
Machine shop turnings	3.25 to	3.75
No. 1 busheling	4.50 to	5.00
No. 2 busheling	2.75 to	3.25
Rails for rolling	7.75 to	8.25
No. 1 locomotive tires	7.25 to	7.75
Short rails	10.00 to	10.50
Cast iron carwheels	7.25 to	7.75
No. 1 machinery cast	6.75 to	7.25
No. 1 railroad cast	6.25 to	6.75
Burnt cast	4.50 to	5.00
Stove plate	4.50 to	5.00
Agricultural malleable	7.75 to	8.25
Railroad malleable	8.00 to	8.50

DETROIT

Dealers' buying prices per gross ton:

Hvy. melting steel	$8.00 to	$8.50
Borings and short turnings	6.00 to	6.50
Long turnings	5.00 to	5.50
No. 1 machinery cast	8.00 to	8.50
Automotive cast	10.00 to	10.50
Hydraul. comp. sheets	7.75 to	8.25
Stove plate	4.00 to	4.50
New No. 1 busheling	6.25 to	6.75
Old No. 2 busheling	4.00 to	4.50
Sheet clippings	3.50 to	4.00
Flashings	5.00 to	5.50

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$7.00	$8.00
Rails, scrap	7.00	8.00
No. 1 wrought	6.00	8.00
Machine shop turnings	2.00	2.00
Boiler plate	5.00	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron	7.00	11.00
No. 1 machinery cast	12.50	10.00
Stove plate	10.00	8.00
Standard carwheels	10.00	8.00
Malleable	10.00	8.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock—	
Rounds and hexagons	2.95c.
Squares and flats	2.95c.
Hoops and bands, under ¼ in.	2.95c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.10c.
Galv. sheets (No. 24), 25 or more bundles	3.60c.
Hot-rolled sheets (No. 10) 2.60c. to	2.90c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	$3.61
Spikes, large	2.40c.
Small	2.65c.
Boat	2.90c.
Track bolts, all sizes, per 100 count, 70 per cent off list.	
Machine bolts, 100 count, 70 per cent off list.	
Carriage bolts, 100 count, 70 per cent off list.	
Nuts, all styles, 100 count, 70 per cent off list.	
Large rivets, base per 100 lb.	$3.00
Wire, black, soft ann'l'd, base per 100 lb.	2.65
Wire, galv. soft, base per 100 lb.	3.10
Common wire nails, per keg	2.20
Cement coated nails, per keg	2.20

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.75c.
Reinforc. bars, billet steel	1.55c. to 1.70c.
Rail steel reinforcement	1.30c. to 1.45c.
Cold-fin. steel bars and shafting	3.00c.
Rounds and hexagons	3.50c.
Flats and squares	
Bands, 3/16 in. (in Nos. 10 and 12 gages)	2.95c.
Hoops (No. 14 gage and lighter)	3.50c.
Hot-rolled annealed sheets (No. 24)	3.45c.
Galv. sheets (No. 24)	3.50c.
Hot-rolled sheets (No. 10)	2.75c.
Spikes (3/16 in. and lighter)	3.45c.
Track bolts	4.30c.
Rivets, structural (keg lots)	2.75c.
Rivets, boiler (keg lots)	2.75c.

	Per Cent Off List
Machine bolts	65
Carriage bolts	65
Coach and lag screws	65
Hot-pressed nuts, sq., tap. or blank	65
Hot-pressed nuts, hex., tap. or blank	65
Hex. head cap screws	50 and 10
Cup point set screws	75
Flat head bright wood screws	50 and 10
Spring cotters	60 and 10
Stove bolts	80
Rd. hd. tank rivets, 7/16 in. and smaller	65
Wrought washers	$4.50 off list
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

NEW YORK

	Base per Lb.
Plates and struc. shapes	3.10c.
Soft steel bars, small shapes	3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	5.75c. to 6.25c.
Cold-fin. shafting and screw stock; Rounds and hexagons	3.54c.
Flats and squares	4.04c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.30c.
Bands	3.30c.
Hot-rolled sheets (No. 10)	2.60c.
Hot-rolled ann'l'd sheets (No. 24*)	3.25c.
Galvanized sheets (No. 24*)	3.50c.
Long terne sheets (No. 24)	4.50c.
Standard tool steel	12.00c.
Wire, black annealed (No. 10)	3.60c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel ½ x ¾ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open hearth spring steel, bases	4.50c. to 7.00c.
Common wire nails, base, per keg	$2.65

	Per Cent Off List
Machine bolt, cut thread:	
¾ x 6 in. and smaller	65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	65 to 65 and 10
¾ x 20 in. and smaller	65 to 65 and 10

	Per 100 Ft.
Boiler tubes:	
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
Cold-fin. rounds, shafting, screw stock	3.35c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.00c.
Hot-rolled sheets (No. 10) up to and inc. 48 in. wide	2.90c.
over 48 in. wide	3.15c.
Black corrug. sheets (No. 24)	3.75c.
Galv. corrug. sheets	4.05c.
Structural rivets	4.00c.
Boiler rivets	4.00c.

	Per Cent Off List
Tank rivets, 7/16 in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	65
Carriage bolts	65
Lag screws	65
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	65
Less than 200 lb.	55
Hot-pressed nuts, hex., blank or tapped, 60 lb. or more	65
Less than 200 lb.	55

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	2.45c.
*Structural shapes	2.45c.
*Soft steel bars, small shapes, iron bars (except bands)	2.45c.
Reinforc. steel bars, sq., twisted and deform.	2.30c.
Cold-finished steel bars	3.35c.
*Steel hoops	3.00c.
*Steel bands, No. 12 to 3/16 in., incl.	2.75c.
Spring steel	5.00c.
†Hot-rolled annealed sheets (No. 24)	3.15c.
†Galvanized sheets (No. 24)	3.50c.
*Hot-rolled annealed sheets (No. 10)	2.70c.
Diam. pat. floor plates, ¼ in.	5.00c.
Swedish iron bars	5.00c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

* Base prices subject to deductions on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.75c.
Reinforc. steel bars	1.75c. to 1.95c.
Cold-fin. steel bars	2.95c.
Flat rolled steel under ¼ in.	3.00c.
Cold-finished strip	5.55c.
Hot-rolled annealed sheets (No. 24)	3.25c.
Galvanized sheets (No. 24)	3.50c.
Hot-rolled sheets (No. 10)	3.00c.
Black ann'l'd wire, per 100 lb.	$2.55
No. 9 galv. wire, per 100 lb.	2.90
Com. wire nails, base per keg	2.10

* Net base, including boxing and cutting to length.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
New billet reinforc. bars	3.00c.
Rail steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.20c.
Cold-fin. rounds and hex.	3.32c.
Squares and flats	3.32c.
Hot-rolled annealed sheets (No. 24)	3.75c.
Galv. sheets (No. 24)	3.55c.
Hot-rolled sheets (No. 10)	3.30c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain, per 100 lb.	10.35

	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$15.57
4-in.	34.57
Lap-welded steel boiler tubes, 2-in.	15.12
4-in.	32.96

BUFFALO

	Base per Lb.
Plates and struc. shapes	3.10c.
Soft steel bars	2.95c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.00c.
Rounds and hex.	3.00c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.35c.
Galv. sheets (No. 24)	3.75c.
Bands	3.30c.
Hoops	3.55c.
Hot-rolled sheets (No. 10) 48-in. and narrower	3.00c.
Wider than 48-in.	3.25c.
Com. wire nails, base per keg	$2.40
Black wire, base per 100 lb.	2.35

BOSTON

	Per Lb.
*Beams, channels, angles, tees, zees	3.00c.
*H beams and shapes	3.00c.
*Plates—sheared, tank and univ. mill, ¼ in. thick and heavier	3.00c.
Floor plates, diamond pattern	5.25c.
*Bar and bar shapes (mild steel)	2.90c.
*Bands 3/16 in. thick and No. 12 ga. incl.	3.40c.
Hoops, No. 14 ga. and lighter	4.90c. to 5.40c.
*Half rounds, hf. ovals, ovals and bevels	4.15c.
Tire steel, rd. edge 1½ x ⅛ in. and larger	4.50c.
Smaller sizes	4.75c.
Cold-finished rounds and hexagons	3.60c.
Cold-rolled strip steel	5.20c.
Cold-finished squares and flats	4.10c.
*Blue annealed sheets, No. 10 ga.	3.15c.
One pass cold-rolled sheets No. 24 ga.	3.50c.
Blued stove pipe sheets, No. 24 ga.	3.90c.
Galvanized sheet sheets No. 24 ga.	4.00c.
Lead coated (long ternes) No. 24 ga.	5.00c.
Black wire, base per 100 lb., 2500 lb. or less	3.25c.
Over 2500 lb.	3.25c.

* Base prices for 15,000 lb. orders, extras apply for smaller quantities.

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates, tank and U.M.	2.80c.	3.30c.	3.00c.
Shapes, standard	3.15c.	3.30c.	3.00c.
Wide-flanged beams and columns	3.25c.	3.30c.	3.50c.
Soft steel bars	3.15c.	3.30c.	3.00c.
*Reinforcing bars	2.90c.	3.00c.	3.00c.
Hot-rolled annealed sheets (No. 24)	3.80c.	4.20c.	4.25c.
Hot-rolled sheets (No. 10)	3.15c.	3.80c.	3.50c.
Galv. sheets (No. 24)	4.40c.	4.50c.	4.75c.
*Struc. rivets, ⅞ in. and larger	5.75c.	6.90c.	5.25c.
*Cold finished steel Rounds	5.50c.	5.50c.	5.50c.
Squares and hexagons	6.75c.	6.75c.	6.75c.
Flats	7.25c.	7.25c.	7.25c.
Common wire nails —base per keg less carload	$2.40	$2.40	$2.50

* Subject to deductions for quantity.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Department of Sanitation, Municipal Building, New York, has filed plans for addition to two-story refuse and garbage incinerator plant on East 139th Street, and for similar expansion at incinerator works on East Seventy-fourth Street. Cost about $80,000 with equipment.

General Motors Corpn., Detroit, will arrange for production at branch works, Tarrytown, N. Y., of Pontiac automobiles, including parts and assembling, for Middle Atlantic and New England states, heretofore carried out at Pontiac, Mich. Plant will be ready for service in June, when employment will be given to about 3000 men for new division. Company will continue production of Chevrolet automobiles at Tarrytown as in past.

American Brass Fountain Equipment Co., Inc., New York, has been organized by Irving Huppert, 1710 Montgomery Avenue, Bronx, and associates, to manufacture soda fountain equipment and fixtures, parts, etc.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 23 for three compression-type pneumatic riveters (Schedule 33), one motor-driven cylinder grinding machine (Schedule 57), three test stands (Schedule 97) for New York Navy Yard.

John Eichler Brewing Co., 3582 Third Avenue, New York, plans expansion and improvements, with installation of brew-house, bottling and other mechanical equipment. Cost over $125,000 with machinery.

Cornell-Dubilier Corpn., New York, is being organized to take over Dubilier Condenser Corpn., 4377 Bronx Boulevard, Bronx, manufacturer of radio condensers and allied equipment, and Cornell Electric Mfg. Co., 33-01 Forty-eighth Avenue, Long Island City, manufacturer of kindred equipment and electrical specialties. Last noted works will be removed to Dubilier plant, where production will be expanded. Buell Hollister, head of Dubilier company, will be chairman of board of consolidated organization.

Construction Service, Veterans' Administration, Washington, asks bids until June 6 for deep-well pumping machinery and accessories, with pump house, at institution at Northport, L. I.

Suburban Bronze Works, Inc., Long Island City, has been organized by Louis F. DeSena, 86-20 101st Avenue, Ozone Park, N. Y., and associates, to manufacture bronze, brass and other metal castings.

Manor Brewery, Manor Road, West New Brighton, S. I., formerly known as Monroe-Eckstein Brewery, has been acquired by new interests. Plans are under way for addition and improvements in present unit. Cost about $170,000 with machinery.

Signal Supply Officer, Army Base, Brooklyn, asks bids until May 29 for shaft bearings, armatures, coils, resistors, switches, fuses, voltmeters and other equipment (Circular 113).

Allied Brewing Corpn., 25 Broadway, New York, recently organized, has acquired former brewing plant in metropolitan district, and will carry out extensions and improvements, including additional equipment. Cost over $175,000 with machinery. Company lately acquired site for new plant at Long Island City, and will now hold project for development later.

Fox Mfg. Co., Paterson, N. J., care of Mendelsohn & Mendelsohn, 136 Washington Street, representative, has been organized by Morris Fox, Paterson, and associates, to manufacture machinery and parts, and operate a general foundry.

Wilson-Jones Co., 3300 Franklin Boulevard, Chicago, manufacturer of loose-leaf devices and equipment, let general contract to White Construction Co., 95 Madison Avenue, New York, for one-story branch plant at Elizabeth, N. J., 150 x 450 ft. Cost about $75,000 with equipment. Leo F. Caproni, 472 Elm Street, New Haven, Conn., is architect.

Commanding Officer, Picatinny Arsenal, near Dover, N. J., asks bids until May 22 for 36,700 galvanized carriage bolts (Circular 220).

Atlantic City Brewing & Ice Co., Atlantic City, N. J., recently organized to take over City Ice Co., 105 North Missouri Avenue, is having plans drawn by Schwarz Laboratories, Inc., 202 East Forty-fourth Street, New York, architect and engineer, for addition to brewing plant, including improvements in present unit. Cost about $200,000 with equipment. Charles Proebstle is president.

R. & S. Mfg. Co., Trenton, N. J., has been organized by Frederick Schultz and Walter R. Reikosky, 340 North Broad Street, to manufacture electrical appliances and equipment.

Midland Tube & Pipe Co., River Road, Bordentown, N. J., manufacturer of seamless steel tubing, steel pipe, etc., has acquired former one-story plant of American Ball Engine Co., Bound Brook, N. J., on 4-acre tract, for new branch plant.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 23 for towers, with tilting test stand, platform ladders, plunging frame, rotor, operating mechanisms and controls (Schedule 119) for Philadelphia Navy Yard.

Virginia Tank Storage Co., operated by Pennsylvania Shipping Co., 260 South Broad Street, Philadelphia, has leased property on Craney Island, Norfolk, Va., for new tank storage plant for oils and other liquid products. Company plans installation of steel tanks and other equipment.

John Wood Mfg. Co., Conshohocken, Pa., has adopted full time production schedule in automobile equipment manufacturing division, and has orders on hand to insure such basis for next three months.

Trainer Brewing Co., 1306 Fitzwater Street, Philadelphia, has awarded general contract to Francis A. Canuso & Son, 809 South Twelfth Street, for addition for storage and distributing service. Cost about $40,000 with equipment. J. G. Fitzmaurice is company engineer.

M. Beck Brewing Co., 461 North Division Street, Buffalo, has plans for extensions and improvements, including additional equipment.

Cortland Machine & Tool Co., Inc., Cortland, N. Y., has been organized, capital $50,000, by Ernest E. and J. Engelbert Dahlstrom, 16 Central Avenue, to manufacture machinery and tools. New company will take over organization of same name, with local plant for manufacture of fish line machinery and other equipment.

CENTRAL DISTRICT

Home Brewing Co., Braddock, Pa., has approved plans for extensions and improvements, with installation of additional equipment. Cost over $50,000 with machinery.

Pittsburgh Forgings Co., Grant Building, Pittsburgh, has increased production schedule at plant at Coraopolis, Pa., with adoption of night and day shifts.

Valley Mead Brewing Co., Meadville, Pa., recently organized to take over local plant of French Creek Brewing Co., has engaged Braziell & Anderson, 309 Fourth Avenue, Pittsburgh, architects, to prepare plans for addition and improvements in present unit. Cost about $250,000 with machinery. P. J. Corll, Youngstown, Ohio, is president.

Owens-Illinois Glass Co., 965 Wall Street, Toledo, Ohio, plans two one-story additions to branch bottle manufacturing plant at Charleston, W. Va. Cost over $175,000 with equipment.

Ingram-Richardson Mfg. Co., Beaver Falls, Pa., manufacturer of enameled iron products, has adopted full time, three 8-hr. shifts, for first time in over two years.

Domestic Gas & Burner Co., Zanesville, Ohio, has been organized by Herbert L. and John Whikehart, and Thomas H. Moore, 910 Buckeye Building, Columbus, Ohio, to manufacture gas burners and gas-burning equipment.

Standard Chromate Co., Painesville, Ohio, manufacturer of chrome products, industrial chemicals, etc., plans one-story addition and improvements in present plant. Cost over $40,000 with equipment.

A. B. Loomis, 5208 Harvard Avenue, Cleveland, engineer, is preparing plans for new multi-story brewing plant, including power house and pumping station on local site, for company now being organized. Cost over $200,000 with equipment.

Premier Beverage Co., Middletown, Ohio, operating former Sebald Brewery, plans expansion and improvement, including additional equipment. Company has arranged financing in amount of $200,000, practically entire sum to be used for purpose noted.

Frigidaire Corpn., Dayton, Ohio, is doubling production schedules at two local plants, and will give employment to about 7600 men.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until May 23 for three motor-driven turret lathes (Circular 610), 16 flood-light lamp assemblies (Circular 612), 65 cable meter assemblies and 55 rewind hand cranks (Circular 611); until May 22, one electrically-heated furnace (Circular 607); until May 24, two balloon hull assemblies (Circular 573), tachometer assemblies in lots of 100 to 200 (Circular 579), 725 engine gage units and 1035 thermometer assemblies (Circular 575), 21 electric water coolers (Circular 559); until May 29, 500 air speed indicator assemblies (Circular 586), five 16-in. engine lathes (Circular 581), 10 manifold assemblies (Circular 615), seven vapor cleaning machines (Circular 584), eight bomb-rack assemblies (Circular 592), 12 aluminum alloy propeller blades and one counterbalance (Circular 613), five electric heat-treating furnaces and one electric muffle furnace (Circular 588).

Peerless Wire Goods Co., Lafayette, Ind., has adopted capacity production for first time in 18 months, giving employment to 150 men on two 11-hr. day shifts.

Lafayette Brewery, Inc., Lafayette, Ind., has plans for extensions and improvements in two-story plant, including additional equipment. Cost over $40,000 with machinery. Frank P. Riedel, 716 South Twelfth Street, is architect.

Evansville Tool Works, Inc., Evansville, Ind., has been organized by George O. Clifford and Robert Raymond, Evansville, to manufacture tools, forgings, etc. Company will take over local organization of same name.

Tivoli Brewing Co., 10129 Mack Avenue, Detroit, let general contract to Martin-Krausmann Co., 955 East Jefferson Street, for addition and improvements in present plant. Cost over $50,000 with equipment. Howard H. Colby is executive vice-president.

Hare Stoker Corpn., Detroit, has been organized by W. A. Hare, 4853 Rivard Street, and associates, to manufacture stokers and parts.

Kolb Brewing Co., 603 Germania Avenue, Bay City, Mich., has approved plans for extensions and improvements, including additional equipment. Cost over $40,000 with machinery.

Lenon Corpn., Detroit, has been organized by Herbert E. Brannon, 17743 Northrop Avenue, to manufacture electrical machines and parts.

Great Lakes Brewing Co., Bridge Street and Indiana Avenue, Grand Rapids, Mich., recently organized by Neal W. Taplin, 112 Barclay Avenue, N. E., and associates, is planning new multi-story plant. Cost about $250,000 with equipment.

SOUTH ATLANTIC

Construction Service, Veterans' Administration, Washington, asks bids until May 31 for boiler, stoker and accessories for institution at Oteen, N. C.

Cloverdale Brewing Co., 2000 Bolton Street, Baltimore, Pannill Martin, president, has selected 15-acre site on Washington Boulevard, for new brewery. Plans for initial multi-story unit will soon be drawn. Cost over $175,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until May 19 for 500 steel drums, steel drills, steel wool, six trailers, six copper or bronze floats, and other supplies (Schedule 2865); until May 22, steel filing equipment, locks, copper wire, brass washers, oil cans, chain links, etc. (Schedule 2868); until May 26, three Diesel engine-driven generators, each 75-kw. capacity (Schedule 2864).

Atlanta Milling Co., 196 Butler Street, S. E., Atlanta, Ga., plans installation of elevating equipment, conveyors, loaders and other handling equipment in connection with rebuilding elevator and milling plant unit recently destroyed by fire. Loss over $200,000 with machinery.

Piedmont Iron Works, Inc., Gastonia, N. C., has been organized by George B. Mason and A. G. Myers, Gastonia, to manufacture iron and steel specialties, and operate general iron works.

City Council, Burlington, N. C., asks bids until May 22 for equipment for sewage disposal plant, including pumps, grit and sludge removing equipment, pipe lines, etc. A. C. Linberg is consulting engineer.

Sonoco Products Co., Hartsville, S. C., let general contract to Southern Builders, Inc., 148

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Pacific Coast Distributors—Columbia Steel Company, San Francisco, California.
Export Distributors—United States Steel Products Company, New York, N. Y.

Chase Avenue, Florence, S. C., for one-story machine shop, 80 x 100 ft. Cost about $21,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 23 for vacuum pumps (Schedule 126) for Anacostia, D. C., Navy Yard; 14,400 ship scrapers (Schedule 42) for Brooklyn, Mare Island and Puget Sound yards; vacuum tubes (Schedule 123) for Mare Island and Brooklyn yards; 20,800 lb. brass boat facings (Schedule 76) for Western yards; 10,200 sheet steel dust pans (Schedule 40) 780 pairs tinners' shears (Schedule 41) for Brooklyn, Mare Island and Puget Sound yards; two air ejectors (Schedule 98) for Mare Island yard; 40 aluminum alloy propeller blades (Schedule 106) for Philadelphia and Washington yards; until May 31, 297 portable electric drills (Schedule 62), 12 corrosion resisting steel gasoline storage tanks (Schedule 70), steam reducing valves and spare parts (Schedule 77); until May 23, 12 portable electric pumps and spare parts (Schedule 13), 10 valve reseating equipments (Schedule 48) for Eastern and Western yards.

NEW ENGLAND

Croft Brewing Co., Roxbury Crossing, Boston, operating former brewing plant of Highland Spring Brewery, asks bids on general contract for one-story and basement addition, 60 x 125 ft., including improvements in present unit. Cost about $100,000 with equipment; further expansion is planned later to double this expenditure. John F. Hunt & Co., 545 West Twentieth Street, New York, are architects and engineers.

Russell Harrington Cutlery Co., Southbridge, Mass., has been organized, capital $250,000, to manufacture cutlery. Company is headed by J. Cheney Wells, president, American Optical Co., same place; Channing M. Wells, and Ira Mosher, 14 Mechanic Street.

Harvard Electric Co., Harvard, Mass., an interest of Massachusetts Lighting Companies, Inc., 89 Broad Street, Boston, has acquired Ayer Electric Light Co., Ayer, Mass. Purchasing company has secured permission to issue stock for $91,741, part of proceeds to be used for extensions and improvements.

Smith Brothers, Inc., Cottsal Street, New Bedford, Mass., has plans for extensions and improvements in brewery. Cost about $65,000 with equipment. Emil Hartmann, North Middleboro, Mass., is architect.

Remington Arms Co., Bridgeport, Conn., has advanced production schedule from three to five-day week, increasing working quota to 1200 men.

Wakefield Machine Co., Wakefield, Mass., has been organized by Perry A. and Walter M. Davison, Wakefield, to manufacture machinery and parts.

Consumers Brewing Co., Inc., 25 Fountain Street, Providence, R. I., P. S. Haney, head, has approved plans for extensions and improvements in former Elizabeth Textile Mills, Hillsgrove, R. I., for new brewery. Cost $200,000 with equipment. Emil Hartmann, North Middleboro, Mass., is architect.

SOUTHWEST

State Board of Affairs, State Capitol Building, Oklahoma City, Okla., will begin work soon on one and two-story power plant, 60 x 175 ft., at Oklahoma State Penitentiary, Stringtown. Unit will include a machine shop. Cost over $100,000. Layton, Hicks & Forsyth, Braniff Building, Oklahoma City, are architects.

Radio Station KVOO, Tulsa, Okla., William B. Way, manager, has plans for two-story and basement broadcasting station, with power house, steel towers, etc. Cost about $125,000 with equipment.

Thomery Corpn., Kansas City, Mo., has been organized by A. O. Thomson and Alan W. Slattery, 6411 Jefferson Street, to manufacture internal combustion engine equipment, including mufflers, etc.

Wolff Pipe & Iron Co., St. Louis, has been organized by Edwin Lopata and Isadore Wolff, 3807 Potomac Street, and associates, to manufacture iron pipe and kindred products.

Common Council, Humphrey, Ark., plans installation of electric pumping machinery and auxiliary equipment for municipal water system. Cost about $25,000 with pipe line.

Sieloff Packing Co., 4320 Sacramento Street, St. Louis, meat packer, has plans for two-story addition to plant at Newstead Avenue and Natural Bridge Road. Cost about $45,000 with equipment. Wedmeyer & Nelson, Wainright Building, are architects.

Houston Ice & Brewing Co., 2510 Calumet Drive, Houston, Tex., Frantz Brogniez, head, has leased local property for new brewing plant. Cost close to $250,000 with machinery. William Peddicord, Houston, is architect.

Marathon Oil Co., Fort Worth, Tex., with headquarters at Tulsa, Okla., has filed plans for extensions and improvements in local oil refinery, to cost about $300,000, forming part of general expansion program to represent investment of about $650,000 with equipment.

SOUTH CENTRAL

Louisiana Brewery Co., Slattery Building, Shreveport, La., recently organized by E. R. Ratcliff and associates, has acquired property at foot of Spring Street, and will remodel for new plant. Cost over $60,000 with machinery.

Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, has reopened brass foundry at Louisville plant, reinstating a large number of men.

Purity Extract Co., Broad and Second Streets, Chattanooga, Tenn., is considering erection of four-story and basement brewing plant. Cost over $150,000 with equipment.

Wheland Co., Twenty-eighth and Broad Streets, Chattanooga, Tenn., mechanical equipment, plans rebuilding part of machine shop recently destroyed by fire.

Standard Brewery, South Johnson Street, New Orleans, recently acquired by new interests headed by Guy L. Deano, 738 Pedido Street, plans expansion and improvements, including new equipment. Cost over $40,000. A company is being organized to operate plant. J. J. Legarde, Maritime Building, is architect.

Delta Cotton Oil Co., Valley Street, Jackson, Miss., plans extensions in cotton seed oil mill, with installation of tanks, water tower and other equipment; a one-story addition will be built.

Opelousas Compress Co., Opelousas, La., plans expansion, with installation of new density press and accessories. Cost about $25,000.

Lannon Mfg. Co., Tullahoma, Tenn., manufacturer of baseball bats and other turned hardwood products, has plans for three-story addition. Cost about $40,000 with equipment.

MIDDLE WEST

Hyde Park Brewing Co., New Athens, Ill., will carry out expansion and improvements, including additional equipment. Cost about $50,000 with machinery.

Bismarck Brewing Co., Chicago, recently organized by George J. Halligan, president, George J. Halligan Supply Co., 111 West Washington Street, pipe and pipe fittings, and associates, with capital of $1,000,000, has acquired former plant of Citizens Brewery Co., Archer Avenue and Throop Street, for about $350,000. Plans are under way for extensions and improvements, including additional equipment. Cost about $70,000 with machinery.

Cole's Hot Blast Mfg. Co., 3108 West Fifty-first Street, Chicago, has been organized by Hugh L. Cole and A. F. Wedderspoon, capital $100,000, to manufacture hot blast furnaces and equipment, parts, etc.

Cold Spring Brewing Co., Cold Spring, Minn., has approved plans for extensions and improvements, including additional equipment. Cost about $125,000 with machinery.

National Enameling & Stamping Co., Granite City, Ill., is beginning production of steel beer kegs and plans to develop extensive capacity in new line.

Minnesota Oil & Refining Co., Pence Building, Minneapolis, is planning one-story bulk oil storage and distributing plant, 100 x 120 ft. Cost about $40,000 with tanks and other equipment.

Chicago Carton Co., 4433 Ogden Avenue, Chicago, manufacturer of corrugated and other paper containers, asks bids on general contract for new two-story and basement plant, 260 x 500 ft. Cost about $300,000 with machinery. A. Epstein, 2001 West Pershing Road, is architect and engineer.

Signal Supply Officer, Procurement District, 1819 West Pershing Road, Chicago, asks bids until May 23 for ringer brackets, 100,000 rings, fuses, etc. (Circular 49), motor-generator charging set (Circular 50), rings, hooks, etc. (Circular 52).

Bayley Blower Co., Milwaukee, manufacturer of air conditioning systems and allied equipment, has moved its plant and offices from 1938 South Fourth Street, to 1817 South Sixty-fourth Street, in West Allis, to gain more room and operate more economically. Company was organized recently to take over business of Bayley Blower Mfg. Co., Milwaukee.

Crown Vending Equipment Co., Cudahy, Wis., recently organized, has moved plant and offices to 836 South Bay Street, Milwaukee, increasing floor space to 15,000 sq. ft. Additional equipment is being purchased for manufacture of vending machines designed by J. F. Dohrwardt, president and general manager.

Richard Wohlford, 918 Plumber Street, Wausau, Wis., has acquired plant and property of former Tomahawk Novelty Co., Tomahawk, Wis., and will do considerable retooling for manufacture of wooden boxes, beer cases and other shipping containers.

T. F. Durst, Waukesha, Wis., has purchased property of I. B. Rowell Co., Waukesha, manufacturer of farm equipment and tools, for $73,603 at sheriff's sale and as trustee for bond holders plans organization of new company to resume production.

Seymour Woodenware Co., Seymour, Wis., has plans by E. A. Wettengel, architect, 116 South Pierce Avenue, Appleton, Wis., for new factory, costing about $35,000, to replace buildings wrecked by fire recently.

PACIFIC COAST

Fort Sutter Brewing Co., 509 North Tenth Street, Sacramento, Cal., William Dreher, president, has plans for new brewery on 7-acre tract, including pumping station, boiler plant, machine shop and other units. Cost about $250,000 with equipment.

Santa Fe Brewing Co., Los Angeles, recently organized with capital of $1,000,000 by Robert A. Horowitz, 448 South Hill Street, and associates, is planning three-story brewery, 140 x 165 ft., on Santa Fe Avenue, Fifteenth to Sixteenth Street, where property is being acquired. Cost over $275,000 with equipment. Frank J. Kashare, Los Angeles, is interested in new company.

Municipal Light and Power Department, Pasadena, Cal., has plans for installation of an overlap, apron type conveyor with geared motor drive at refuse incinerator plant. Benjamin F. DeLanty is superintendent.

Buffalo Brewery, Twenty-first and R Streets, Sacramento, Cal., Frank Ruhstaller, 920 J Street, president, plans extensions and improvements, including additional equipment. Cost over $50,000 with machinery.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 23 for 6400 lb. iron and steel welding electrodes and 400 lb. steel electrodes (Schedule 66) for San Diego Navy Yard; one feed-water heater with storage tank (Schedule 34) for Mare Island yard.

Bureau of Power and Light, 207 South Broadway, Los Angeles, E. F. Scattergood, chief electrical engineer, has plans for steel tower transmission line from city to Hoover Dam, Boulder Canyon, Nev., about 271 miles, comprising 111 miles two-tower line and 60 miles single tower line; 2256 towers will be purchased, in addition to transformers, oil-circuit breakers and auxiliary equipment. Fund of $22,800,000 will be available for program on July 1.

Superintendent of Lighthouses, Sixteenth Lighthouse District, Ketchikan, Alaska, asks bids until June 6 for two Diesel engine-driven air compressor units with accessories (Proposal 6500).

Henry Weinhard Brewery Co., Portland, recently organized by Henry Weissinger, Portland, and associates, capital $300,000, has let general contract to L. H. Hoffman, Public Service Building, for extensions and improvements in plant on Twelfth Street. Cost over $200,000 with equipment.

Horluck Malt & Brew Co., Seattle, George Horluck, president, plans converting four-story building at Westlake and Mercer Streets for new brewery. Extensions will be made in present structure and new equipment installed. Cost about $200,000 with machinery.

FOREIGN

Shanghai Telephone Co., Shanghai, China, has arranged for bond issue of 10,000,000 Shanghai dollars (about $2,500,000), large portion of fund to be used for expansion and improvements, including station construction and lines. Company is a subsidiary of International Telephone & Telegraph Co., 67 Broad Street, New York.

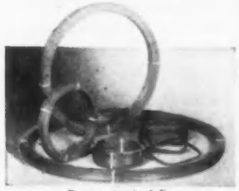
Cuban Cane Products Co., Havana, Cuba, sugar mills and properties of company will be offered at a public sale on May 31. Holdings of company are appraised at $25,000,000.

Toyo Fibre Industry Co., Ltd., Tokyo, Japan, now being organized as a subsidiary of Okura Corpn., Tokyo, with capital of 10,000,000 yen (about $2,500,000), is planning erection of new mill for manufacture of fiber products. Cost over $1,000,000 with equipment.

Which is a Better Buy?

Patented

Garlock Chevron packing adjusts itself automatically—the greater the pressure, the tighter it packs. It has saved money in thousands of plants. It will save money for you!



Patent Applied For

Garlock Guardian Gaskets give extraordinary service on pipe lines subject to expansion and contraction and on equipment operating against extreme pressures. Of semi-metallic construction, these gaskets are resilient, rugged and reliable.

Garlock 7021 High Pressure Asbestos Sheet Packing is an outstanding gasket material for use against oil, gasoline or steam at high temperatures and pressures. It is standard in many oil refineries and other industrial plants for all gasketing service.

Packing which costs less and lasts a few weeks . . . or Garlock Packing which may cost a little more and lasts many months?

BUDGETS are more inflexible today than ever before. Consequently each expenditure for plant maintenance materials receives the closest kind of scrutiny. Dollars must be saved.

But dollars cannot be saved by the false economy of purchasing cheap materials. That's the old story of the fallacy of judging a product on the basis of price alone instead of on the basis of quality and performance.

When buying packings stick to proven, time-tested Garlock Packings, and you'll win in the end. Behind every box of Garlock packing there are almost fifty years of manufacturing experience and constructive service to industry.

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK
In Canada: The Garlock Packing Company of Canada, Ltd., Montreal, Quebec

GARLOCK
Quality Controlled
PACKINGS

Steel Entente Announces Six New Comptoirs

Six comptoirs to administer export sales of iron and steel products have just been created by the European Steel Entente to remain operative for two years from June 1, 1933, according to a report to the Commerce Department's Iron and Steel Division.

Export sales of semi-finished products, beams, hoop iron, merchant bars, medium sheets, and heavy sheets, will be handled by the six newly created comptoirs.

Prolongation of the life of the comptoirs for an additional three years and price fixing will be discussed at future meetings.

Producers of Central and Eastern Europe will not be invited into the Entente until after the newly-created comptoirs have commenced operations.

The European Steel Entente was first organized in September, 1926, for the stated purpose of limiting the tonnage of crude steel produced by the membership to that part of world consumption which they were in a position to satisfy.

Producers of iron and steel products in Germany, France, Belgium, Luxemburg, the Saar, Austria, Hungary and Czechoslovakia were members of the original Entente. The five first named constitute the present membership of the Entente as renewed a few weeks ago.

Universal Credit Corp'n Sold to C. I. T.

Contracts have been signed for the sale by the Ford Motor Co. of its interest in the Universal Credit Corpn. to Commercial Investment Trust Corpn., according to a joint announcement made by Henry Ford and Henry Ittleson, president of C. I. T. Universal Credit Corpn. has been for a number of years the automobile financing organization of the Ford Motor Co. For its interest the Ford Motor Co. will receive approximately $30,000,000.

J & L Makes Boiler Tubes On Push Bench Mill

Jones & Laughlin Steel Corpn., Pittsburgh, has announced a complete line of hot-rolled seamless steel boiler tubes. A push-bench mill, the only one of its kind in this country, is used for manufacture. The forging action of this mill is claimed to be excellent, the quality of the steel being improved with each step in the process.

These J & L boiler tubes are said to have exceptional ductility and to lend themselves quite readily to rolling in and beading operations. A striking characteristic of the tubes is their appearance, the surfaces both inside and outside being unusually smooth. This, the manufacturer states, is an important factor in retarding corrosion when the tubes are in use and in minimizing depreciation while they are held in stock.

The product complies with the A. S. M. E. Boiler Code, A. S. T. M. specifications, and the U. S. Steamboat Inspection service rules and regulations.

Twenty-Fifth Anniversary of Machinery Club

Early in 1907 while the Hudson & Manhattan Railroad Co. was constructing its Hudson River Tunnel and building its down town terminal under 30 and 50 Church Street, Francis H. Stillman, president of the Watson Stillman Co., conceived the idea of organizing a club, which would be the center of the machinery industry in New York.

Mr. Stillman conferred with a group of the most prominent machinery men of that time and decided to go ahead.

The two top floors of 50 Church Street were leased from the Hudson & Manhattan Railroad Co., and have been occupied now for 25 years as one of the most successful downtown luncheon clubs.

Edwin A. Stillman, son of the founder, and himself the thirteenth president of the club, presided at the twenty-fifth anniversary of the club's operation at a dinner held on May 4.

Two of the charter members, Henry Prentiss and Alonzo B. See, are still actively interested in the club, as are also 89 resident members who belonged at the time the club was first opened.

The present officers of the club are: E. A. Stillman, president; C. C. Hubbell, vice-president, and Garrett Burgert, treasurer.

Power Show at Chicago

The Sixth Power Show at Chicago previously scheduled for the Coliseum will be transferred to the exhibition hall of the Stevens Hotel, the center of "Engineering Week" activities of the Century of Progress.

This change in location will permit the engineering profession visiting Chicago to visit the show while attending their meetings, and brings together the week's big "Engineers' Day" banquet and the exhibit in the same building.

Approval of participating in "Engineering Week" of the World's Fair has been given already by 19 engineering associations. Others will also participate. The organizations cooperating are as follows:

American Association for the Advancement of Science
American Association of Engineers
American Ceramic Society
American Foundrymen's Association
American Institute of Electrical Engineers
American Institute of Mining and Metallurgical Engineers
American Society of Civil Engineers
American Society of Mechanical Engineers
American Society of Municipal Engineers
American Society for Testing Materials
American Society of Agricultural Engineers
National Council of State Boards of Engineering Examiners
Society for the Promotion of Engineering Education
Society of Industrial Engineers
Institute of Radio Engineers
Western Society of Engineers
American Society of Refrigerating Engineers
American Welding Society
National Industrial Advertisers Association
National District Heating Association

The arrangements as a whole have progressed sufficiently to indicate that the conventions and exhibit will be in the nature of a vast school showing what is new and advanced in thought and machinery.

Industrial Finance

American Steel Foundries has declared a dividend of 50c. on its preferred stock, the same as was paid three months ago. The dividend is payable June 30 to stock of record June 15. For the quarter ended March 31 net loss was $495,532, against net loss of $350,300 in the first quarter of 1932.

Directors of J. I. Case Co. have declared a quarterly dividend of $1 a share on the preferred stock, thereby establishing a $4 annual rate. Three months ago $1 was declared and prior to that time $1.75 had been paid quarterly.

Cleveland-Cliffs Iron Co. had a net loss of $2,532,727 in the first quarter.

Youngstown Sheet & Tube Co. reports a loss of $3,473,370 in the first quarter after all charges for interest, depreciation, depletion, etc.

Wheeling Steel Corpn., Wheeling, W. Va., in the quarter ended March 31, had net loss after all charges of $802,419.

National Steel Corpn. has reported net profits for the first quarter amounting to $280,844 after depreciation and depletion, bond interest, Federal taxes and all other charges. These earnings, which are equivalent to 13c. a share on 2,156,832 shares of stock outstanding, compare with $592,799 or 27c. a share for the corresponding quarter of 1932. The company reports that its cash and quick asset position as of March 31, 1933, is the best in its history.

Inland Steel Co. reports a net loss for the first quarter of $1,012,053.25.

Why SILICO-MANGANESE* GIVES

Cleaner Steel

IN SHORTER TIME

FURNACE additions of Silico-Manganese effect maximum deoxidation of the open hearth bath in 10 to 15 minutes.

Here is the reason:

Rapid displacement of oxides before the furnace is tapped depends principally upon using an agent which forms large, easily fusible slag particles. Silico-Manganese does this by promoting the formation of extremely large manganese silicates, which are among the most fusible compounds known.

Electromet Silico-Manganese is an electric furnace product containing 12 to 14 per cent. silicon, 65 to 70 per cent. manganese, and a maximum of 3 per cent. carbon. It is ideal for this purpose because, since it can be used in smaller amounts than less concentrated alloys, it does not lower the temperature of the bath so much and does not introduce so much carbon.

Electromet Metallurgical Engineers will be glad to give you further information on this subject. Write today for details.

**Silico-Manganese is a combination alloy of silicon and manganese.*

ELECTRO METALLURGICAL SALES CORPORATION
Unit of Union Carbide and Carbon Corporation
UCC
Carbide and Carbon Building, 30 East 42nd Street, New York, N. Y.

Electromet
Ferro-Alloys & Metals

Finds Magnetic Clutches Cut Maintenance and Accident Cost

THE Briggs Mfg. Co., Detroit, eliminates hazards and assures continuous operation by equipping large power presses with disk magnetic clutches.

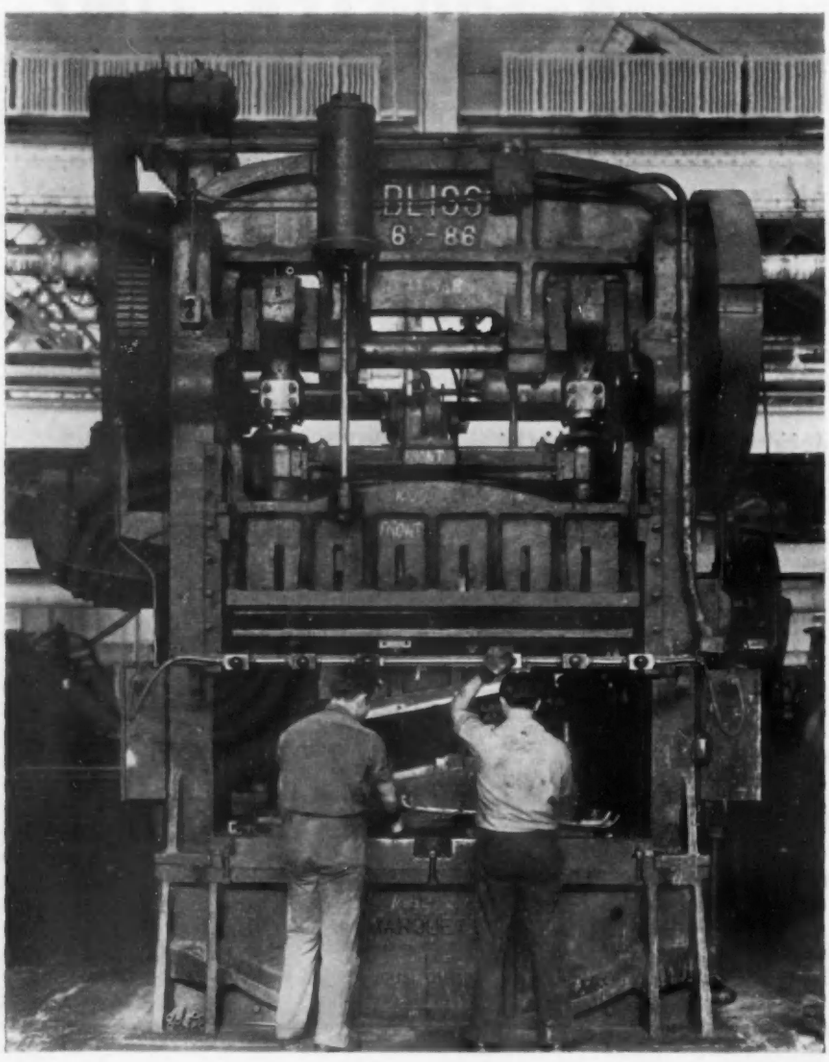
The electrical apparatus controlling the movement of each press is automatic and will not function until all circuits are closed. It is impossible to operate the press unless both hands of each operator are on buttons in a safe position with respect to the die or slide.

Prior to the installation of magnetic clutches at the Briggs plant, the maintenance expense for power presses was far greater than it is today. Presses are started and stopped without jerking or jarring. There are fewer moving and wearing parts than when the presses were mechanically controlled.

On each press is a selector switch with four stations through which the operation of the machine is automatically controlled. So far as the first station is concerned, when all "start" buttons are depressed, the clutch engages and the press completes one cycle, stopping automatically with the slide at the top stroke. Station 2 insures continuous operation. After starting, a press will run continuously until stopped by depressing one of the "stop" buttons provided for each worker. A press is thus operated when the work enables the operators to catch every stroke it makes.

To provide special safety for slow-running presses in which the operator might attempt to adjust the work on the die after the cycle had started, a third station sometimes is used. By means of it operators must depress all "start" buttons and hold them until the slide reaches the bottom of the stroke. The length of the holding time is determined by an adjustable cam. If any operator releases a button too soon, the press will stop instantly.

For die setting, an inching station with a separate button is employed. The press runs so long as the button is depressed and stops when it is released. The station also is so arranged that definite increments can be given to the slide movement.



Continuous Rolling of Hot and Cold Strip

(*Concluded from Page 779*)

pass throughout the coiling operation, thus loosening and throwing off the secondary scale formation.

In the matter of cold rolling with the Steckel mill, speeds are of the order of 1500 ft. per min. By pulling the material through the working rolls, the latter are thus relieved of supplying transmission torque. This tension rolling, he said, has enabled the use of work rolls as small as 2 in. in diameter 7 in. long; of 3 in. diameter up to a length of 20 in., and 5 in. diameter 38 in. long, the lengths being the lengths of the body between neck bearings.

In the case of tough steels, he told of the 18 per cent chromium 8 per cent nickel rustless alloy being rolled between 3-in. rolls from an initial thickness of ¼ in. and a width of 18 in. down to 0.018 in. without an intermediate anneal. With 5-in. diameter rolls, he rolled low-carbon steel 36 in. wide from an initial thickness of 0.080 in. to a final thickness of 0.003 in. without an intermediate anneal. In cold rolling tin plate, an initial thickness greater than 0.080 in. is not at all objectionable, he asserted, and in fact an initial thickness as great as 0.125 in. maximum may, in certain cases, be advantageous.

When the mill is applied to making tin plate, the practice is to provide for 15 per cent reduction on every pass, and in some cases as high as 30 per cent reduction is taken, the aim being to use the full overload capacity of the motors in the form of torque or in the form of speed or both.

The cost of cold-rolling strip steel for tin plate from 0.080 in. to 0.010 in. has been reduced as low, he said, as $2.50 a ton, this cost including direct labor, power, entire roll cost as to first cost and all regrinding, water, oil, maintenance guides and all repairs. Upkeep of main bearings over several years has been zero.

The preferable initial thickness of pickled hot-rolled strip entering the mill for tin plate production he put at about 0.10 in. and the preferable length of such material as 500 or 600 ft. or more. The capacity of the cold mill in producing base-gage tin-plate strip of 0.011 in. is easily, he claimed, 1 ton per hr. per ft. of width. Power consumption is about 100 kwhr. per ton if the bare, useful mill requirement only is considered, and about 120 kwhr. per ton if power consumption of motor-generator sets during idle periods and power consumption of all plant auxiliaries of all sorts are included.

Can . . . . 1933 work with 1920 tools?

AMERICAN industry stands at the threshold of reconstruction hardened and agile, but with partly obsolete implements at hand.

Back in 1930 extensive surveys showed that 48 per cent of all machine tools in metal working shops were installed before 1920.

The figures for auto plants were 28 per cent and for railroad shops 73 per cent.

During the past three years there has been little replacement of mechanical equipment. Machine tool orders declined from an index of 281 in 1929 to 35 in 1932.

Yet new inventions have gone forward by leaps and bounds. American patents granted in 1932 totaled 62,000 against 45,000 in 1930.

Many of these inventions have made even relatively new equipment obsolete. Recovery will heighten, not lessen, the need for efficient machines in industry.

It will remain for the machine tool makers to place modern tools in the hands of industry.

The Interlake Iron Corporation, for many years, has been a supplier of pig iron and foundry coke for the production of castings used by leading machine tool companies.

INTERLAKE IRON CORPORATION

PIG IRON - COKE

PLANTS—CHICAGO . DULUTH . TOLEDO . ERIE

PICKANDS, MATHER & COMPANY, *Sales Agents*

CLEVELAND . CHICAGO . DETROIT . ERIE . TOLEDO . MINNEAPOLIS . DULUTH

Preheats Sheet Rolls Electrically

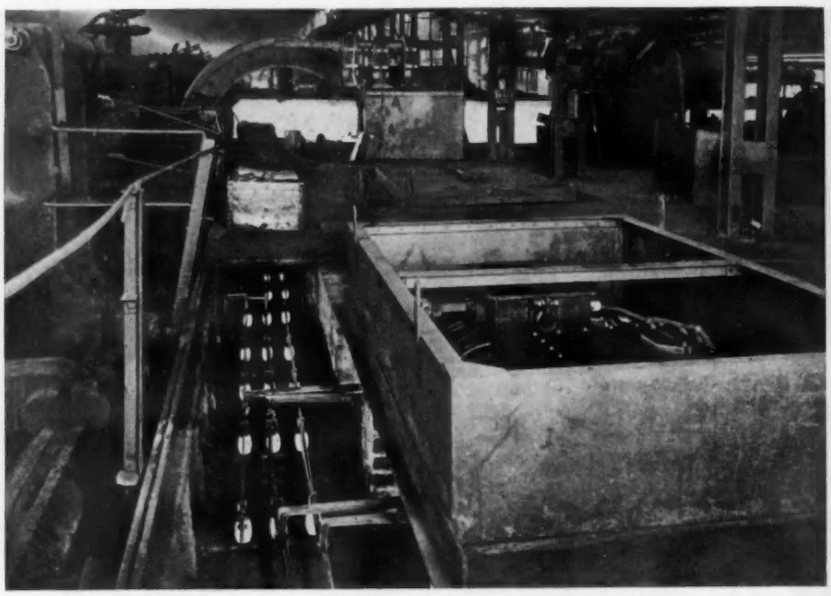
(*Concluded from Page 782*)

with the savings effected in reduced roll breakages. In other words, the cost of rolls ($480 to $720 each) is one of the large individual items in sheet rolling and generally amounts to dollars a ton, while the cost of electric heating averages cents, say 4c. a ton. The same arguments apply to the relative initial outlay for the heaters when compared with the cost of a roll, as a saving of two rolls more than offsets the capital expenditure for an induction heater.

The induction heater may also be used in the annealing of so-called green rolls before they are put into service. The fact that a roll that is left several days in a mold before stripping gives better results than otherwise is taken to prove the advisability of liberating casting stresses by annealing before grinding.

A further point Mr. Robiette makes is that the electric heater provides easy means to keep hot a spare pair of rolls ready for replacement in the event of a roll breakage in service. Quick replacement minimizes loss in production and also the risk of breakage that is likely if production be hastened by starting with a cold roll.

In explanation of the value of induction heating, it is pointed out that a cast-iron roll consists of a gray-iron core merging through a mottled area to a hard chilled white-iron skin which averages ¾ in. thick. This skin, which contains a high proportion of free cementite, has a considerably higher coefficient of expansion than the soft graphitic interior. The conclusion therefore is that any method of heating that aims at applying heat externally possesses disadvantages. The induction method of heating develops the heat gradually in the mass of metal between the surface and the core, so that, on the score that the temperature gradient between the center and the surface is exceedingly small, excessive internal strains are not likely to occur.



The transformer for the roll heaters may be placed midway of the roll train, and the busbars to the heaters run under floor plates.

Breakages of Rolls

	14 Mills Without Preheating	8 Mills With Induction Heaters
Monday	16	5
Tuesday	10	2
Wednesday	5	1
Thursday	7	3
Friday	1	2
Saturday	1	..
Total	40	13
Bottom rolls, per cent	75	40
Top rolls, per cent	25	60

Twelve Months' Comparisons with Preheating by Oil

	First Shift, Aver. Product'n per Mill, Gross Tons	Rolls Broken	Broken Rolls, Cost per Ton
7 mills, electric heating	6145	15	$0.32
7 mills,			
Oil heating, 4½ mos.		10	0.70
Unheating, 7½ mos.	5650	22	0.60
7 mills, unheated	5650	29	0.58

All the mills were similar in size, conditions of working and product rolled.

Results of Three Months' Working

	Total Rolls Broken	First Day Breakage	Total Production, Tons	Roll Cost per Ton
7 mill drive				
6 weeks unheated	5	1	3068	$1.00
7 weeks oil heated	6	3	4698	0.80
Totals	11		7766	
8 mill drive				
13 weeks electric htg.	4	0	8668	0.28

The working cost per mill per week, the rolls 30 in. in diameter and 42 in. long and heated to 390 deg. F., is put at $2.40 with oil and $4.80 with electricity. The oil cost includes oil at $13.20 a ton and the power required for compressor, power for driving the mill and the labor of two men per group of mills; the electricity is charged at 1c. per kwhr. and the electric operation includes no extras.

Successful Finishing of Die Castings

(*Concluded from Page 783*)

the bare casting was heated, there will be little difficulty experienced.

Thought must be given to the nature of die castings that are being finished. Each casting presents an individual problem. Different die castings will withstand different baking conditions, depending upon the composition of the alloy undercoat. Die castings formed on a base of tin, lead or zinc, should usually not be heated higher than 250 deg. F.; otherwise the metal, which has a low melting point, may sweat out of the casting and cause trouble. Die castings which contain no tin can be baked at somewhat higher temperatures; yet even here care must be exercised so as not to exceed a safe baking point, or the casting will crystallize and become brittle.

Operators should be careful to see that the temperature at which the finishing material is baked should always be slightly lower than the preheating temperature. In some cases die castings can be baked as high as 350 deg. F., whereas other cast parts will not stand more than 224 deg. F. Experiments on the particular die castings to be finished will reveal the maximum and safe heating temperatures. Each plant will have its own peculiar problems, depending upon the character of work to be finished, and generally a series of tests must be undertaken.

It should be borne in mind that the composition of the priming coat has considerable bearing upon the completed work. Especially desirable results have been achieved on zinc and aluminum die castings with certain red metal primers containing considerable iron oxide in combination with appropriate oils and varnishes.